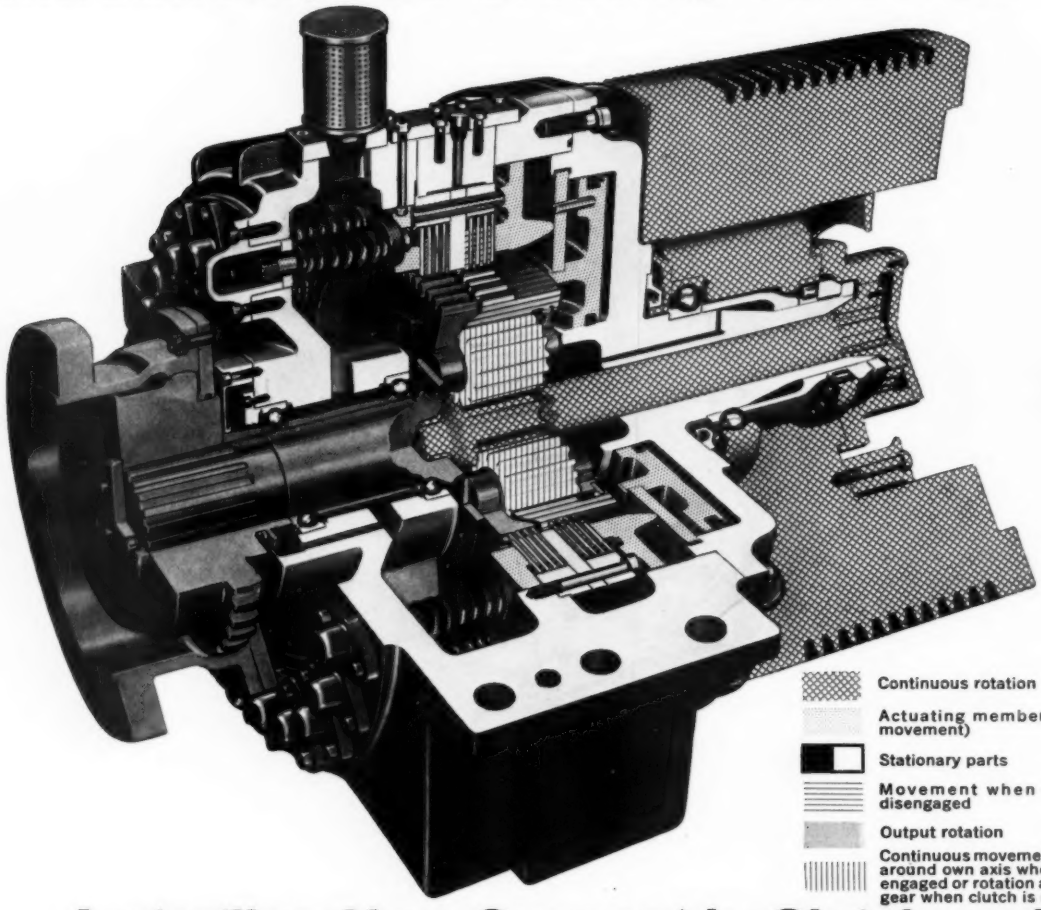
MARCH • 1960

MPM Metal Products Manufacturing

Serving the Appliance and Fabricated Metal Products Industry

Announcing the Clearing Torc-Pac 40



A startling New Concept in Clutch and Brake Design for Large Mechanical Presses

Tested in the laboratory and in the field, the new Clearing Torc-Pac 40 is now ready to accomplish enormous savings in your press operation.

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- A **single unit** can serve as a replacement unit for **all** large presses in your shop.
- Sintered bronze friction linings permanently sealed-in-oil offer unheard of clutch and brake life and **freedom from maintenance.**
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When you have all the facts on the Torc-Pac 40, you will agree that it represents an improvement over existing press drives as marked as the difference between the electric light and the kerosene lamp.

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Bright Molding Quality Finish on Armco 17 (Type 430) Stainless Steel strip offers substantial material cost savings for product trim because it is a bright rolled *mill finish* on an especially economical stainless grade.

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New steels are born at Armco

ARMCO STEEL CORPORATION
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Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

What has Kerns' Drawing Compound got to do with...

...ask Shwayder Bros., Inc.

Shown below is the coater where **Kerns' "Dry-Film"®** is applied to draw blanks in the production of deep drawn shells for Samsonite luggage. Shwayder engineers working with Dow Technical and Service Group tested and found **Kerns' "Dry-Film"® Drawing Compound** most suitable for mass producing magnesium luggage because it **permits severe draws** without the difficulty in cleaning experienced with other products.

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REMEMBER . . . Kerns' technical staff will be happy to work with you in solving light metals forging, drawing or extrusion problems.

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FEATURES

Page

THE ALL-NEW WHIRLPOOL GAS REFRIGERATOR
exclusive MPM design feature describes Whirlpool's completely new gas refrigerator, the result of an intensive two-year research and engineering program 24

HOW TO DETERMINE THE PERFORMANCE OF DIRECT-CONNECTED BLOWERS
performance charts simplify component selection 30

A NEW PLANT FOR FINISHING LIGHTING FIXTURES
installation at Smoot-Holman improves quality, increases production, reduces costs and provides flexibility 32

FABRICATING THE HOTPOINT SPACE-AGE REFRIGERATOR
automatic transfer lines for cabinets and doors provide quick size changeover and speed production—MPM exclusive feature 39

THE DECADE AHEAD FOR CERAMIC COATINGS
research program points up architectural and industrial applications for ceramic coatings in the next ten years 48

SHORT FEATURES

NEW EQUIPMENT FOR UTILIZING PLURAL COMPONENT MATERIALS 22
AN ADVANCE TOWARD "PROGRAMMING" GAS RANGE OVENS 28
NEW FREON-SONIC ENERGY CLEANING SYSTEM 36
SPEED FORMING PRE-PLATED LAWN MOWER HANDLES 52
PORCELAIN ENAMEL SYSTEM DEVELOPED FOR MAGNESIUM 56

DEPARTMENTS

EDITOR'S MAIL 7
FINISH LINE (EDITORIAL) 12
NEW LITERATURE 51
INDUSTRY MEETINGS 57
NEW SUPPLIES AND EQUIPMENT 58
INDUSTRY NEWS 63
INDUSTRY PERSONALS 75
MPM STATISTICS 77
SAFE TRANSIT NEWS 78
COMING FEATURES 81
ADVERTISERS' INDEX & CLASSIFIED 82

METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $8.00 per year, domestic. To all other countries $10.00 per year (U.S. funds). Single copies, $1.00.

Accepted as a controlled circulation publication at Aurora, Illinois.

To the Executive
who watches his Competition closely . . .

Are you investigating Clad-Rex Vinyl-Metal Laminates?

Don't wait *too* long! Because Clad-Rex really reduces manufacturing costs *and* increases product sales appeal. And *that* kind of advantage would be better yours than your competitor's. Many other manufacturing executives are already using Clad-Rex vinyl-metal laminates for electronic equipment cabinets . . . automotive trim . . . appliances . . . furniture, etc.

Here are the facts:

Clad-Rex is a calendered, semi-rigid poly-vinyl chloride film laminated to sheet metal. All alloys and tempers of aluminum and steel (including galvanized and aluminized) are commonly used. Other metals can be used where their special properties are important to end product performance.

The most obvious advantage of Clad-Rex vinyl-metal laminates is styling. It's unlimited! Simulated woodgrains and leathers as well as a wide variety of colors and textures in sparkling burnishes (including high metallics), or non-reflective matte finishes. You can design your own if you prefer!

Not so obvious, *but most important of all*—Clad-Rex vinyl-metal laminates are practical. There is no complex technique or special tooling required to fabricate Clad-Rex. It can be fabricated in almost as many ways as any *un*-finished sheet metal. Furthermore, and without charge, a Field Fabricating Engineer is provided to show your production people how easy it is to get into production with Clad-Rex.

Actually, Clad-Rex *simplifies* your manufacturing operations. It's finished before you get it. Movement of sub-assemblies, etc., through your plant becomes more direct—out of your dies into assembly.

Clad-Rex lowers your end product cost. Although Clad-Rex costs more than *un*finished metal coming into your plant, elimination of expensive handling and finishing adds up to *less cost* when your product is ready to ship. Clad-Rex resistance to abrasion often eliminates the rejects common to *un*finished or other pre-finished metals. This includes the costly efforts to salvage those rejects, too.

Your product may need these other characteristics of Clad-Rex vinyl-metal laminates—high dielectric strength, and resistance to the corrosion of acids, alkalis, and household detergents.

So, see for yourself. Write for details. No obligation, of course. Perhaps you won't be first in your field to begin using Clad-Rex. But why risk competitive disadvantage by being last?

VINYL-METAL LAMINATES BY **CLAD-REX** DIVISION OF SIMONIZ COMPANY

2127 Indiana Avenue • Chicago 16, Illinois

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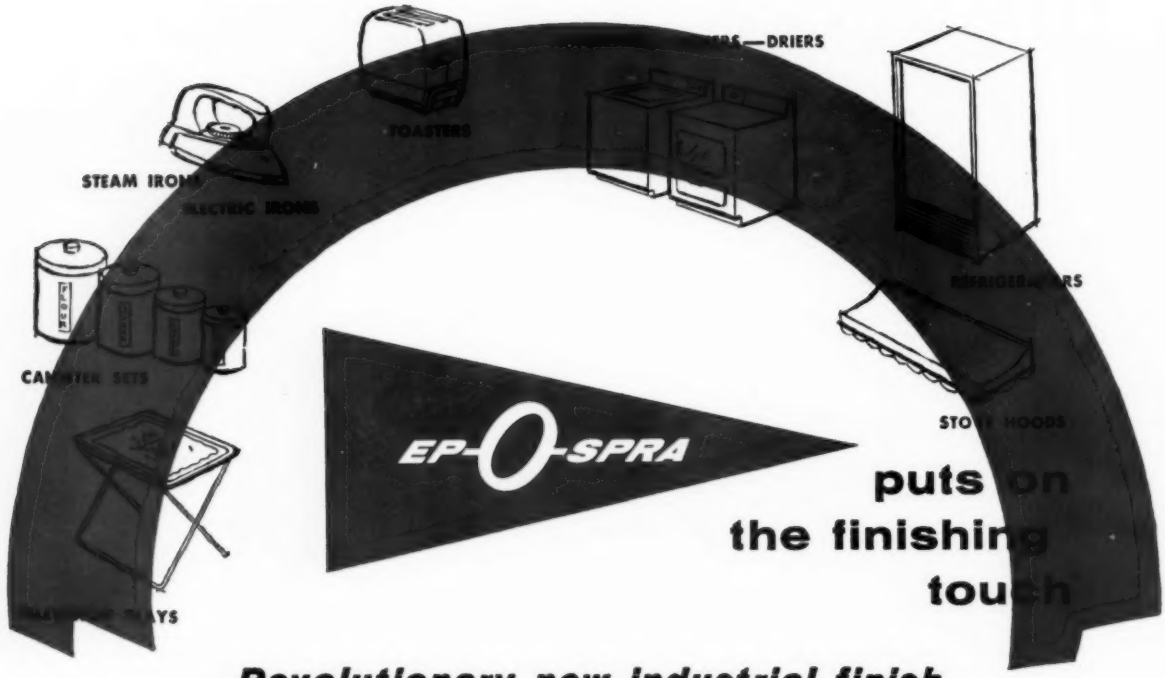
3-A



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from the Editor's Mail

Plastic tool item of interest

Gentlemen: Please send us further information on "Plastic tools simple to make" as stated on Page 41 of the January, 1959 issue of MPM.

Please send the information to my home where I have more time to read.

William S. Steere
George Steere & Sons
Chicago, Ill.

Any reader of MPM may receive monthly copies of the magazine at home on request to our circulation department.

The Editors

Epoxy alloy dies

Gentlemen: We would like to explore the possibilities of epoxy alloy dies, discussed in MPM on Page 10 of the October, 1959 issue.

Particularly, I believe, we need to have the names and addresses of producers of such dies in the Michigan, Ohio, Indiana, and Illinois area.

Any pertinent information you can furnish will be very greatly appreciated.

T. E. Dadson, Chief Range Engineer
Kelvinator Div.
American Motors Corp.
Detroit, Mich.

Thin-wall insulation

Gentlemen: Your January, 1960 issue had an article on the Hotpoint Space Age 18 refrigerator-freezer as an MPM design feature, in which reference was made to a packaged thin-wall insulation called "Wonderwall."

Please forward information as to sources of availability of this material, and whether it is available in standard sizes for design use.

J. H. Malek, Chief Project Engineer
Rowe Mfg. Co., Inc.
Whippany, N. J.

"Wonderwall" insulation was developed, and is produced, by Hotpoint.

The Editors

Better late than never

Gentlemen: Just our luck! Sixteen volumes are already history before we are fortunate enough to come across a copy of your fine publication. But then, there is no use crying over spilled milk.

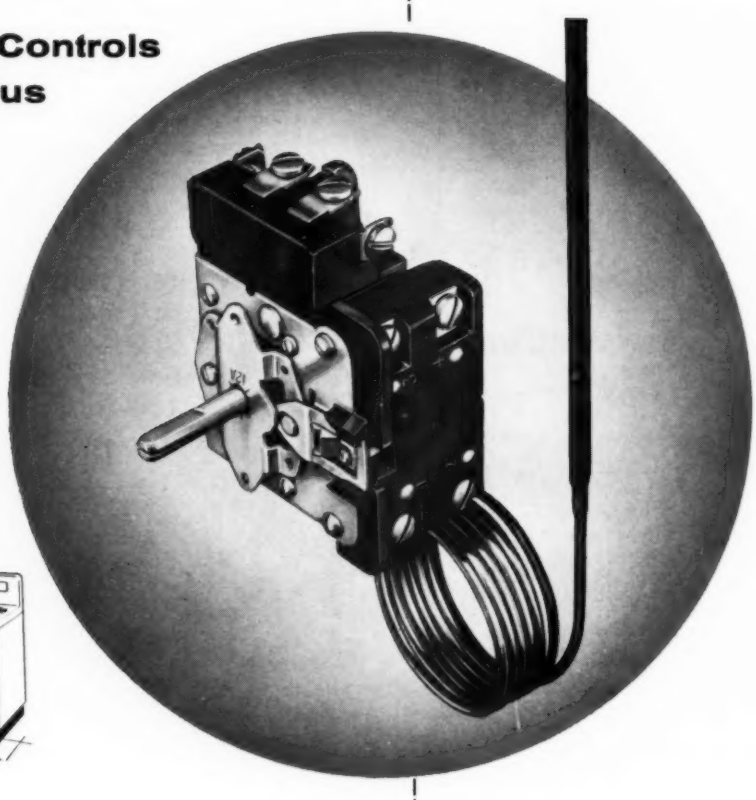
The problem now is, how do we get on your mailing list? Even though we are not in the home appliance field, our interests are in metal products manufacturing, including fabrication, painting, and assembly of electrical operating equipment for the Telegraph Co. A

to Page 10 →

SIMPLIFY

ELECTRIC RANGE DESIGN

One Dial Controls Off-On, Plus Several Heating Circuits



With Wilcolator's G4-A thermostat, you can design a luxury feature into electric ranges at low cost. A built-in switch mechanism makes it possible to control several circuits with a single dial. In addition to positive Off-On control, this permits use of broil heater on reduced voltage in parallel with bake heater to provide balanced heat in oven. It can also provide an additional circuit for low broil or rotisserie, independent of bake and broil heaters. A dial detent position of 500° can be provided for use in baking pre-frozen pies and biscuits. No TV or radio interference. Write for complete information.

Thermostats for Every Heating and Cooling Application

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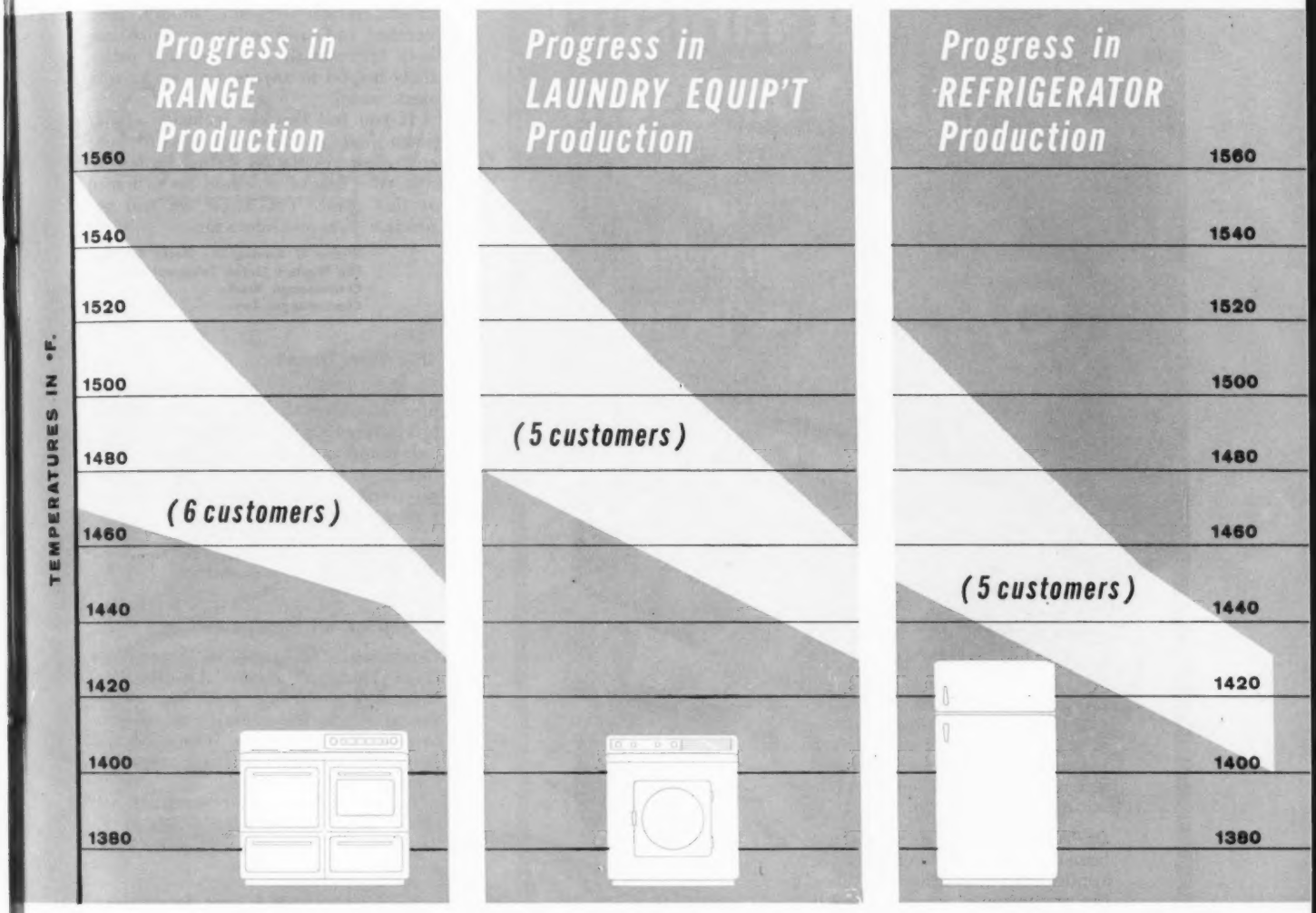
NEMA MEMBER

Firing Temperatures are coming DOWN



Can FERRO'S production-proved LOW-TEMP enamels improve your operations, your profits?

Quietly, without fanfare, a minor revolution has taken place in the porcelain enameling industry this past year. Accelerated in part by critical steel supplies, lower temperature enamels have come into wide use. Firing temperatures are down—in some instances *more than 100 degrees*—without any loss in quality or production volume.

The change-over in most cases has been smooth, relatively simple. Reason for this, of course, is that Ferro's LOW-TEMP enamels have been in limited use for years, have been production-proved over a long period of time, and only needed to be "adapted" to each customer's plant facilities and production requirements.

Both ground-coats and cover-coats are available, some of the latter with smelted-in color. All are easily workable, with properties comparing favorably with higher temperature enamels.

May we tell you more about them, show you how you can profitably use them in *your* operations?

FERRO

FERRO CORPORATION

4150 East 56th Street · Cleveland 5, Ohio

Nashville 11, Tenn. · Los Angeles 39, Calif.

Editor's mail

→ *from Page 7*

careful review of your January, 1960 number indicates subjects which are both interestingly presented and potentially helpful to anyone who works with sheet metal.

If you feel that the inclusion of our name would not be out of line with your controlled circulation status, we believe that your magazine would be well read at this plant. You know we will appreciate your consideration.

Walter G. Davies, Jr., Works Engineer
The Western Union Telegraph Co.
Chattanooga Works
Chattanooga, Tenn.

Ship Safe Transit

Gentlemen: We are interested in setting up a vibration table for improving our products and packaging methods.

I would appreciate your sending information on standards for testing products and packaging methods with a vibration table.

De Wayne Thomas
International Oil Burner Co.
St. Louis, Mo.

Handbook on metal cleaning

Gentlemen: The handbook "Some More Good Things to Know About Metal Cleaning" would be of great interest and use to me in my capacity as superintendent of the Systems Inspection and Receiving Inspection Departments at Carrier Corp.

Please send a copy of this handbook to me at the following address: D. E. Zogg, TR-1, Carrier Corp., Carrier Parkway, Syracuse 1, N. Y.

D. E. Zogg, Superintendent
Sys. & Rec. Insp. MSD
Carrier Corp.
Syracuse, N. Y.

This handbook will be supplied by Oakite Products, Inc., 19 Rector St., New York 6, N. Y.

The Editors

Research cut to a minimum

Gentlemen: I am writing a college text in the area of household equipment and have found MPM to be so very helpful in the chapters dealing with materials. Please enter my personal subscription for the magazine to be sent to my home, as follows: Miss Ruth M. Beard, 417 W. Eighth Ave., Columbus 1, Ohio. Enclosed is a check for eight dollars ($8.00).

The articles in MPM are so very timely and informative, they have cut some of my research to a minimum—the answer was right there in an easy-to-read article. Thank You.

Miss Ruth M. Beard
Household Equipment
The Ohio State University
Columbus, Ohio

THE finish LINE

BUILDING FOR OBSOLESCENCE . . .

is a term which may carry both a favorable and an unfavorable connotation. Unfavorably, some buyers and users of home appliances have the idea that the appliance manufacturer may have instructed his engineers to design products for limited years of service with a view to forcing obsolescence through shorter lived products.

The meaning which we are interested in following in this brief editorial relates to advanced engineering improvements which, through their service to the ultimate user, tend to obsolete the products which do not incorporate the worth-while improvement.

With the domestic refrigerator high on the list with respect to market saturation, any feature or features which can serve to make the owner of older models reach for the pocketbook should be up for serious consideration.

1960 refrigerator improvements

Refrigerators and refrigerator-freezer combinations introduced for 1960 have a wealth of advanced engineering which should appeal to the ultimate buyer. Increase in usable space inside the refrigerator, without increase in exterior measurements, has been an important step forward, for which insulation research can be given worth-while credit.

Refrigerator-freezers that have eliminated entirely the inconvenience of defrosting will certainly be well accepted at the user level—and there are many other less basic, but nevertheless important, innovations in the new lines.

Here comes the ice maker

In our opinion, the advance which stands a better chance of obsoleting all earlier refrigerators than any other single feature is the automatic ice maker. It isn't likely to accomplish this end if it is incorporated in the lines of only one or two major manufacturers, but if it becomes generally used throughout the industry so that the average homemaker with an older refrigerator receives a "home demonstration" in the home of her friend, the demand could easily snowball.

A real chance for obsolescence

In 1952, Servel engineers came up with an automatic ice maker that would eliminate the need for ice trays and provide automatically an adequate and constant supply of ice cubes at all times. There are presently some 150,000 Servel refrigerators in use, made prior to December 31, 1957, which are equipped with these ice makers. (1).

In January, 1958, Whirlpool Corporation acquired Servel's automatic ice maker patents for $1,600,000 as part of the acquisition of the Servel refrigerator manufacturing facility. Whirlpool engineers immediately set about to re-engineer, simplify and modify the ice maker so that it could be included in the new refrigerator line. (2).

In June of 1958, Norge introduced its first automatic ice maker at the Chicago market. (3).

Servel is still in the picture, for Whirlpool has granted the company a non-exclusive license on a royalty basis, and in the meantime, Servel has been operating a research team for the development of a new and improved ice maker—lighter, requiring less space, and easier to install and service. A number of refrigerator manufacturers have been laboratory and field testing this new ice maker during the past year.

Other refrigerator manufacturers who are not as yet on the bandwagon are unquestionably watching the consumer response with keen interest and if, as we anticipate, the public shows sufficient preference for refrigerators equipped with the ice maker, it is entirely possible that the refrigeration industry may have found an effective and constructive tool for obsolescence.

One company estimates that the annual demand for automatic ice makers will be 2,000,000 units by 1965, which could well be a conservative estimate under the right kind of promotion effort by a sufficient number of refrigeration manufacturers.

Dana Chase

EDITOR AND PUBLISHER

(1) Engineering details of the Servel automatic ice maker. (August, 1957 MPM.)

(2) The all new Whirlpool gas refrigerator. (This issue.)

(3) Here's the Norge automatic ice maker. (July, 1958 MPM.)

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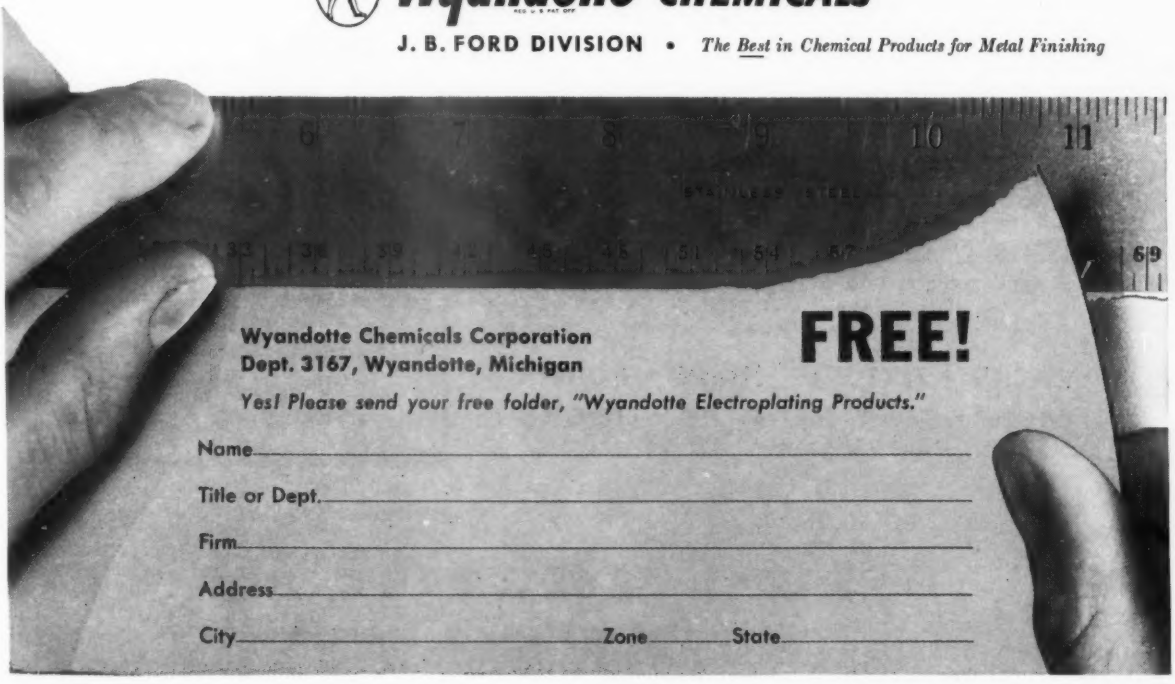

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Dept. 3167, Wyandotte, Michigan

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McLOUTH STAINLESS STEEL

Got a problem that calls for thread-cutting screws?

PARKER-KALON offers three new, improved thread-cutting screws for every application in every material

1 New, Improved P-K Type F*

. . . hardened thread-cutting screws developed for use in friable, granular or brittle material. The pilot, with its five tapping flutes, cuts a machine screw thread as the screw is turned in. The Type F is ideal for making fastenings to ferrous and non-ferrous castings, bronze or brass forgings, heavy gage sheet metals, structural steels, plastics and resin-impregnated plywood.

2 "Pentap"... the new, Improved P-K Type B-F*

(formerly F-Z) combining the five thread-cutting flutes of the Type F screw with the coarse-pitch, widely-spaced threads of the P-K Type B. The thread-cutting "Pentap" Type B-F distributes cutting pressure evenly, lets chips drop to the bottom of the hole, and prevents cracking of material. It is designed for making fastenings to comparatively thin sections and bosses in friable and brittle plastics.

3 P-K® Type L†

. . . is a completely new and improved thread-cutting screw developed by Parker-Kalon especially for use in Nylon. The Type L functions as a combination thread-cutting and thread-forming screw in that it cuts a small amount of the Nylon to allow the full diameter threads to form. Type L offers a particular advantage in Nylon assemblies which must be disassembled for service, because *the P-K Type L can be removed and replaced without stripping or galling.*

The five cutting flutes on the new, improved P-K Type "F" and "BF" reduce pressure development by 80 percent! The completely formed threads on these screws have sharper cutting edges, and 5 deep flutes that are of continuous depth. These features make for better clearance of the accumulated material and assure minimum stresses in driving, and avoid the possibility of stripping or galling.

FOR SEMS . . . and Neoprene or Nylon washer **STAPS®** in thread-cutting and thread-forming tapping screws, or machine screws in any kind of pre-assembled fastener-washer combination, P-K can supply them, too!

KEEP AMERICAN INDUSTRY AT WORK . . . BUY P-K . . . MADE IN U.S.A.

*Patent Pending †U. S. Patent 2,350,346

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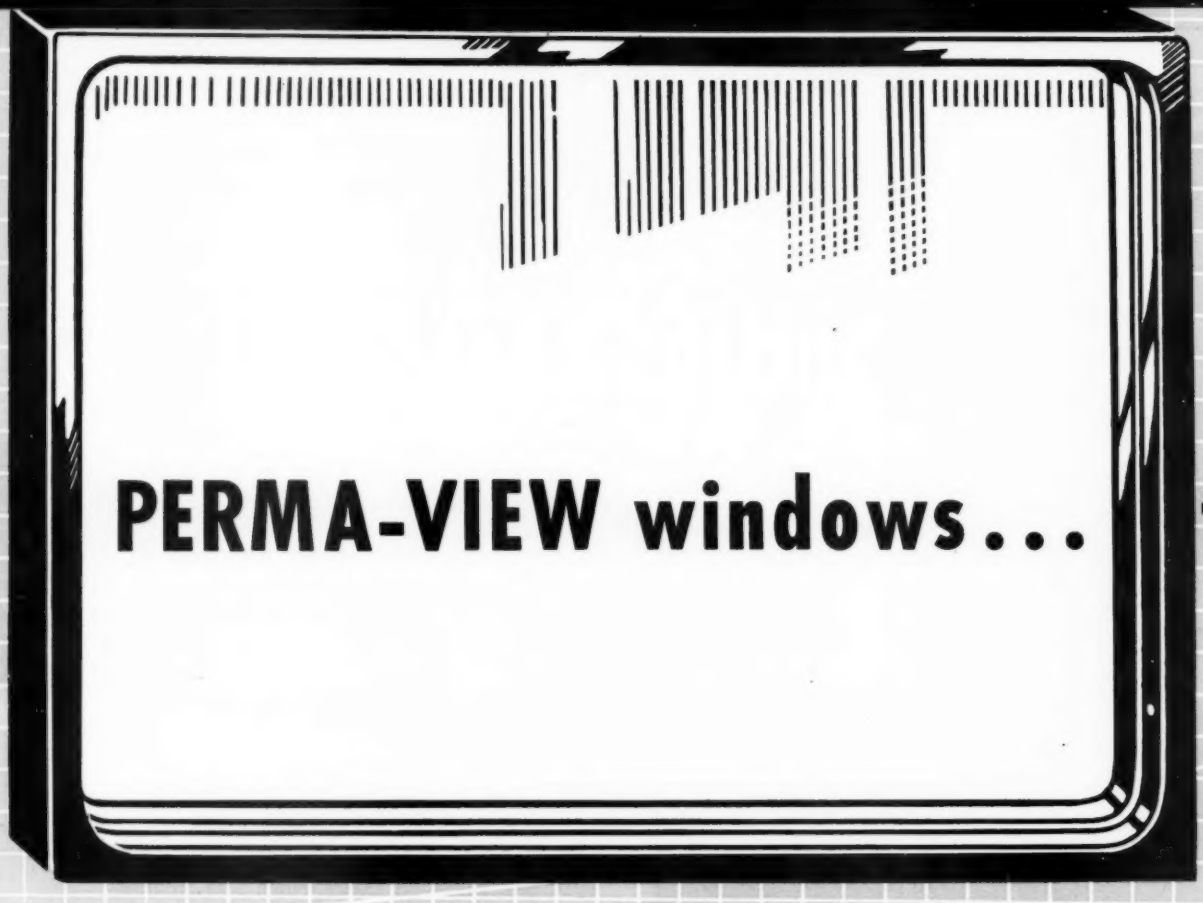
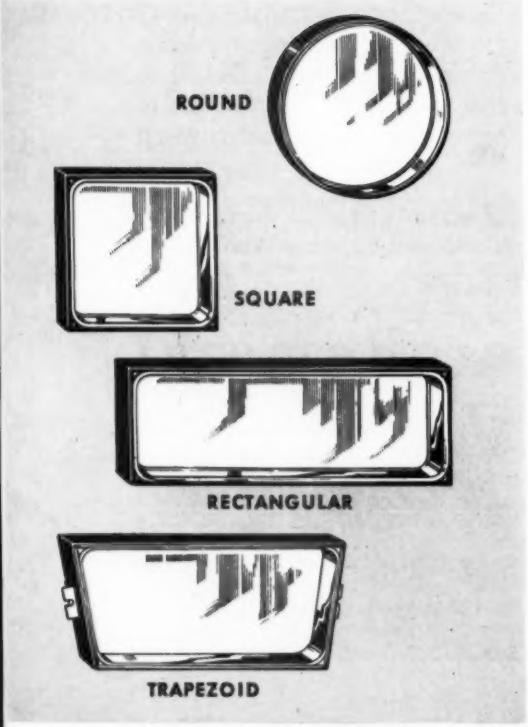


PERMA-VIEW windows... from

*3275% sales increase in 9 years proves Perma-View's wide acceptance.

The universally accepted PERMA-VIEW oven windows



This scientifically designed window, now used in gas and electric ranges produced by leading manufacturers throughout the United States, Canada, and many foreign countries, has now found other practical and useful applications.

PERMA-VIEW windows are now being used for such varied applications as pizza ovens, walk-in coolers, bakery tunnel ovens, commercial roast ovens, and laboratory ovens.

These varied and demanding applications for which PERMA-VIEW windows are being used help to show the quality and durability of this product. The strong steel enclosed, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." Any shape, any size, any thickness can be manufactured to meet your engineering requirements.

Mr. John R. Kauffman, President, "Speedster" Inc., Denver, Colorado, states, "The 'Speedster' ovens are doing an outstanding job in the food service-restaurant equipment field. They are widely used for pizza up to 650 degrees Fahrenheit, as well as normal baking operations up to 550 degrees. Mills Products has an outstanding line. Their products are good, and we are pleased with their service, quality, and design . . . they stand out far better than the manufacturer gaurantees."

*3275% SALES INCREASE

Photo courtesy "Speedster" Inc., Denver, Colorado. This "Speedster" baking oven is widely used throughout the restaurant field for pizza and other baking operations.

pizza ovens to laboratory ovens

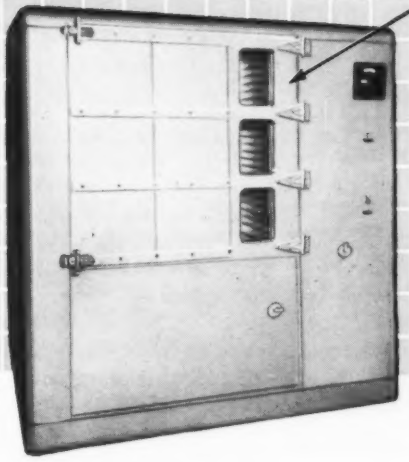


Photo courtesy Despatch Oven Company, Minneapolis, Minnesota. This is a Despatch Saf-T-Bilt laboratory oven, incorporating three PERMA-VIEW windows, precision engineered and manufactured to give exact temperature uniformity and hazard-protection.

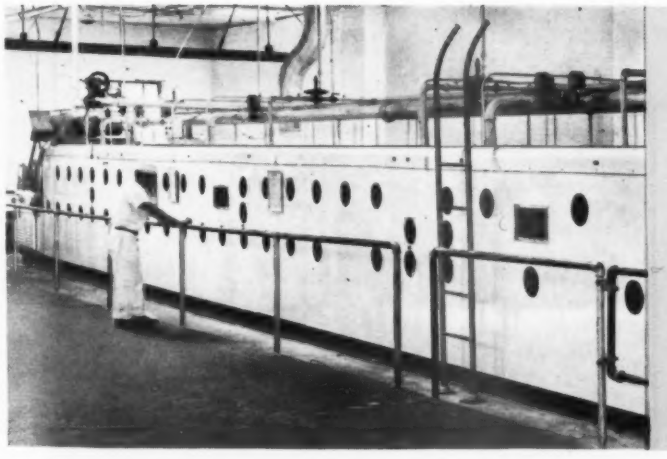
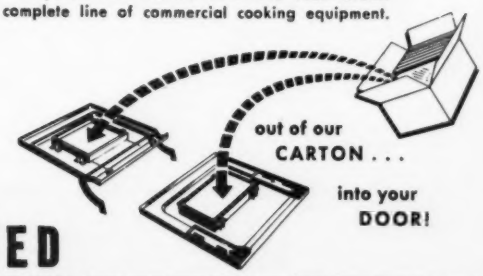


Photo courtesy Baker Perkins Inc., Saginaw, Michigan. This photo shows two PERMA-VIEW inspection windows in the operating side of a Baker Perkins Tunnel Oven installed in a commercial bakery.

Photo courtesy Vulcan-Hart Corp., Louisville, Kentucky. This is one of the Vulcan-Hart electric bake and roast ovens. Part of a complete line of commercial cooking equipment.

THIS IS A GENUINE CLEAR VISION PERMA-VIEW PATENTED NON-FOG WINDOW



MILLS PRODUCTS INCORPORATED

1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN

New equipment for utilizing plural component materials

AN EQUIPMENT DEVELOPMENT in the spray and "pour" application of plastic and other plural component materials has just been announced by Burke B. Roche, president, Binks Mfg. Co., Chicago, at a conference and plant demonstration for the press.

The equipment is based on the development work of T. Keryluk and his son, H. T. Keryluk, now with Binks Research and Development Corp., Boulder, Colo., where the recent research has been conducted. Two principal equipment items are involved: a "Turbulator" spray gun, and a "Formulator" for storing activator, catalyst, and the resin in tanks, and metering them to the Turbulator.

The equipment is presented by the manufacturer as the first method for the continuous application of plural component plastic materials (polyesters, epoxies, gel-coats, foamed-in-place materials, and others) by spraying or "pouring" from a gun.

Principal uses are expected to be: lining or coating storage tanks; coating machinery and food handling equipment; applying structural resins for boats, truck bodies, swimming pools; insulating refrigerators and other appliances; and for use in the building fields.

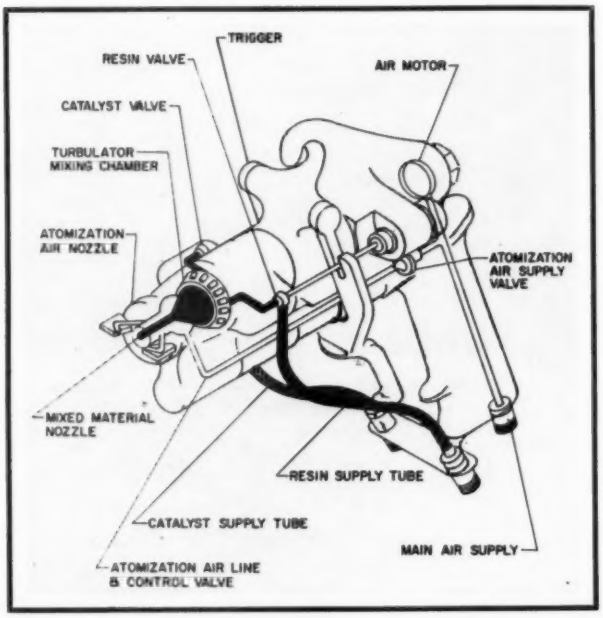
In the Formulator unit, one tank holds the catalyst and activator, and another holds the resin or base element.

Binks Turbulator spray gun is held by the man responsible for its development, Theodore Keryluk. The roller-mounted Formulator unit meters materials to the gun in exact proportions.

Pumps driven by electric motors are adjusted until the right amount of each material for best results is delivered to the Turbulator spray gun. The Formulator is equipped with a solvent tank so that solvent can be pumped through the gun for cleaning it after use and to prevent hardening of the material in lines or spray nozzles (some materials for foamed-in-place applications "set" in four seconds).

The Turbulator spray gun incorpor-

to Page 80 →



PHANTOM VIEW OF TURBULATOR SPRAY GUN FOR USE WITH PLURAL COMPONENT PLASTIC MATERIALS

FOAMED-IN-PLACE INSULATION

The all new Whirlpool gas refrigerator

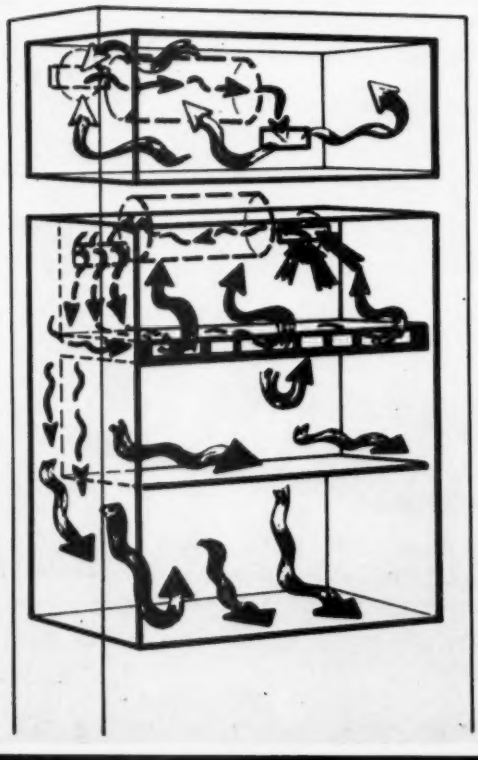
AN EXCLUSIVE MPM DESIGN FEATURE

In keeping with the original concept of the new Whirlpool gas refrigerator, the problem as presented to research and development included the following requirements: (1) a two-door cabinet for freezer and refrigeration storage; (2) air blast cooling for both freezer and refrigerator compartments; (3) frost-free freezer with automatic defrost of coil; (4) cycle defrost of storage cabinet coil; (5) removable ice maker; (6) interior dimensions same as electric models; (7) foam insulation; and (8) fan-cooled absorber (condenser).

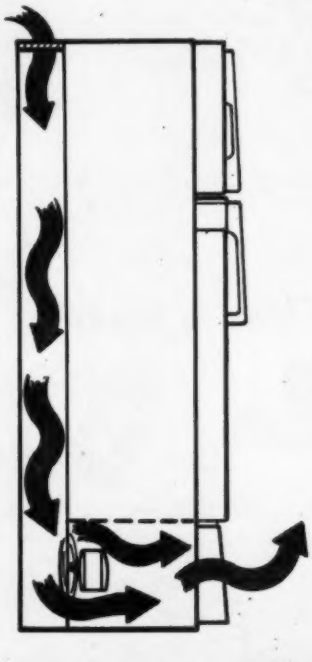
Here are some unit goals attained:

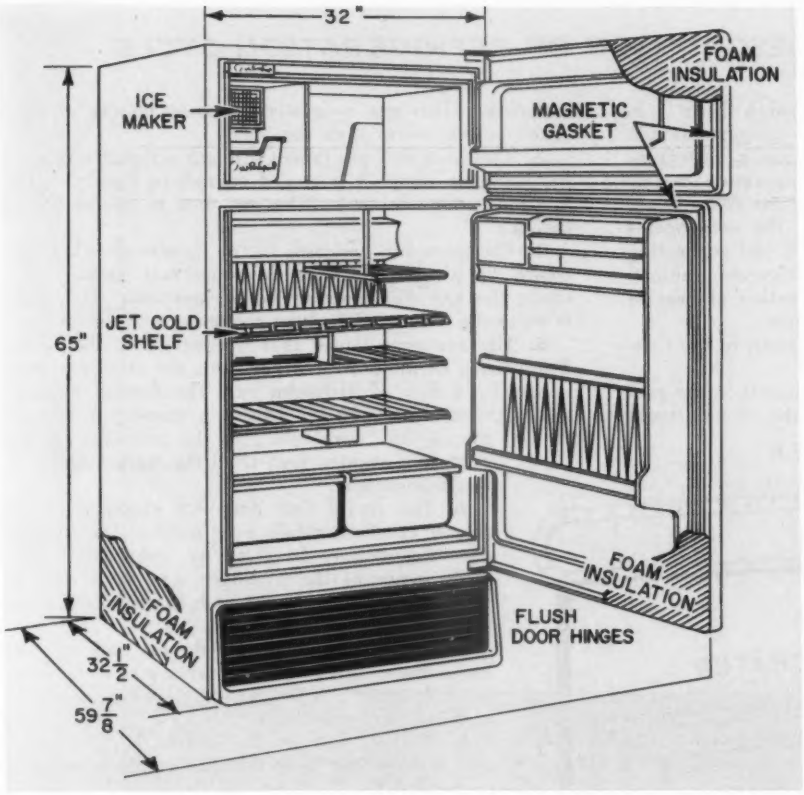
1) weight reduction: 46 per cent.
2) size reduction: 2 inches.
3) reduction in joints.

(Below) — Circulation inside *the refrigerated area. Air enters at the top left side of the frozen food compartment, flows across an evaporator coil, and then circulates in the frozen foods section before passing back to the evaporator coil. In the refrigerated section, the cold air discharges from another evaporator coil down through the jet cold shelf, where it cools the shelves on the inner door panel. Air also passes around the meat pan and down into the rest of the refrigerated area before returning to the top of the liner where it re-enters the evaporator section.*



Circulation outside *the refrigerator cools the condenser and the absorber unit for efficient operation. The addition of this forced air cooling has made it possible to reduce the overall size and weight of the unit. The air for cooling the unit enters at the top of the refrigerator and is discharged at the front. A metered amount of air, sufficient for combustion, enters at the left front of the cabinet, passes through the combustion chamber, mixes with air from the condenser and absorber, and is discharged at the right front of the cabinet.*





(a) pressure joints—24 per cent.
(b) tack welds—33 per cent.

4) increase internal storage volume; .8 to 1.0 cubic feet (due to smaller unit size).

5) reduction in gas consumption: 20 per cent.

6) reduction in number of welds: 28 per cent.

7) minimize gas adjustments: reduced from three to one.

8) achieve zero temperature in freezer compartment: goal achieved.

Three new gas models are being manufactured: a unit with automatic ice maker; an identical unit without ice maker; and a stripped unit which eliminates some of the accessories and is sold as the low model in the line.

AUTOMATIC ICE MAKER

It is expected that eventually the gas refrigerator, when in full production, will be competitive with the only other real competition — electric refrigeration. The size of the unit, the general operating characteristics, appearance, storage capacity and, in the end, the price, will be "comparable" to what the electric industry has to offer.

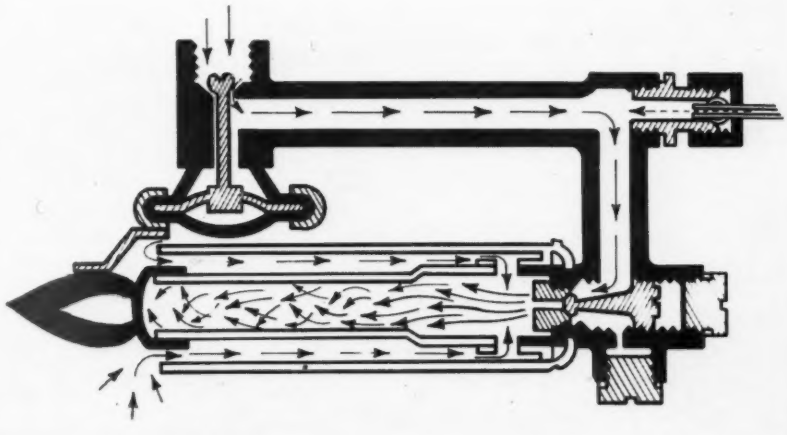
From the merchandising angle, it is expected that even though the original cost of the gas refrigerator remains somewhat higher than the electric, the saving in operating cost that may be expected over the reasonable lifetime of the refrigerator will more than overcome the difference in price.

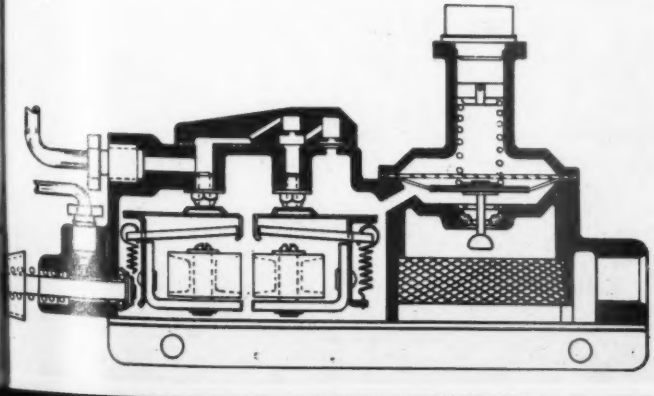
A complete new engineering and tooling setup was required for the absorption unit in the Whirlpool refrigerator, other than that formerly used for the Servel unit. The setup at the plant is more compact, and a number of additional quality control tests were instituted.

Designed for servicing

Service is to be taken into full account in the engineering, so that the ice

(Below) — Cross section of the electric gas control valve. Gas enters at the right of the valve and passes through the filter, up through gas regulating valve (shown by the cross-hatched area), and into the chamber where the electric valves are located. These solenoid valves are controlled by the refrigerator thermostat, and feed the correct amount of gas to the burner, as required by the refrigeration cycle. They are energized as gas is required. One valve controls maximum flame setting for maximum refrigeration; the other meters the gas to an intermediate flame, which will give sufficient refrigeration for the freezer but rob the refrigerator evaporator. This arrangement gives a cyclic defrost on the refrigerator evaporator without affecting the temperature in the freezer appreciably.





(Above) — This cross section of the burner indicates how the bimetallic shutoff valve operates as a safety shutoff. It also shows the passage of gas from top left through the thermostatic shutoff valve, along horizontal right and down through the turbolater at the right end of the burner, which accelerates the mixing of gas with the primary air. The primary air enters at lower left, passes between the two cylinders and mixes with the gas at the end of the turbolater. The primary air necessary for combustion must enter at the front end of the tube, very close to the flame. As a result, all lint and dust are burned before it enters the unit.

NON-TECHNICAL DESCRIPTION OF REFRIGERATION CYCLE

Whirlpool gas refrigerators are equipped with an "absorption-type" refrigeration unit, with all components and connecting tubing welded together to form a system of completely sealed passageways. The refrigeration system is complete when "charged" with hydrogen gas and a liquid mixture of water and ammonia. All of the components except the evaporators, gas heat exchanger, and connecting tube are mounted on the outside of the refrigerator cabinet.

Refrigeration is accomplished by application of heat to the absorption unit in the following manner:

1. The gas burner applies proper heat input to the *Generator*.

2. The liquid mixture of water and ammonia in the *generator* "percolates" through an outlet tube. Some liquid vaporizes. (This gas is mostly ammonia because it has a lower boiling point than the water.)

3. The generated gas passes through a liquid mixture in the *Analyzer* where it is cooled enough to liquefy and remove its water content. (The gas now is almost all ammonia.)

4. The ammonia gas rises to the *Condenser* where it is cooled by air passing over the outer coil surface. As it cools, the gas condenses to liquid ammonia. This liquid flows to the lowest point of the *condenser* and drains out.

5. The ammonia liquid falls by gravity to the *Freezer Evaporator*. In the *freezer evaporator*, the ammonia liquid is met by a flow of hydrogen gas. The flowing hydrogen gas mixes with some of the ammonia, causing it (the ammonia) to "evaporate." As the ammonia is evaporated, it absorbs heat from the freezer section of the refrigerator.

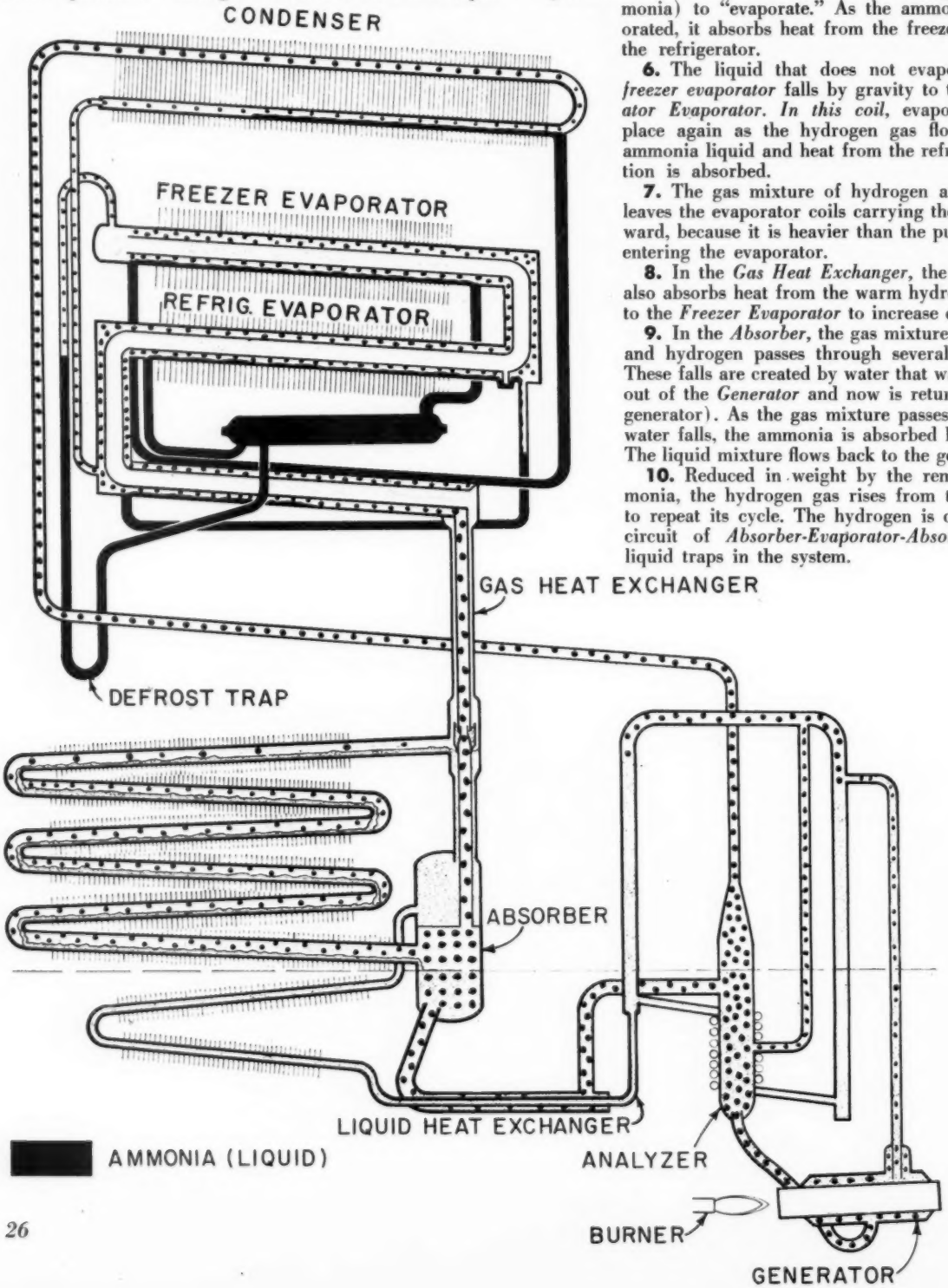
6. The liquid that does not evaporate in the *freezer evaporator* falls by gravity to the *Refrigerator Evaporator. In this coil*, evaporation takes place again as the hydrogen gas flows over the ammonia liquid and heat from the refrigerator section is absorbed.

7. The gas mixture of hydrogen and ammonia leaves the evaporator coils carrying the heat downward, because it is heavier than the pure hydrogen entering the evaporator.

8. In the *Gas Heat Exchanger*, the gas mixture also absorbs heat from the warm hydrogen enroute to the *Freezer Evaporator* to increase efficiency.

9. In the *Absorber*, the gas mixture of ammonia and hydrogen passes through several water falls. These falls are created by water that was percolated out of the *Generator* and now is returning (to the generator). As the gas mixture passes through the water falls, the ammonia is absorbed by the water. The liquid mixture flows back to the generator.

10. Reduced in weight by the removal of ammonia, the hydrogen gas rises from the *Absorber* to repeat its cycle. The hydrogen is confined to a circuit of *Absorber-Evaporator-Absorber* due to liquid traps in the system.



View of instrument board in the customer acceptance laboratory at Whirlpool.

maker, the condenser fan, the clock timer for defrosting, electric gas valve, the gas burner, and all light switches and incidental accessories can be serviced from the front of the cabinet without moving the refrigerator.

A divider in the freezer separates the ice maker from the storage compartment. It has the dual function of preventing food from falling into the ice basket, and reducing the temperature in the freezer compartment by two or three degrees.

The refrigerator can be installed flush with the wall at the back and also flush with the wall or cabinets on both sides. In other words, this free-standing refrigerator can also be changed immediately into a "built-in" by using a furnished grille which will give a minimum of four inches of air space above the refrigerator for adequate circulation.

One feature of the exterior circulating system is the addition of an air filter. This is a urethane foam filter suitable for washing in any household detergent. It is placed over the condenser at the rear of a free-standing unit. When the unit is built-in, the filter can be installed behind the grille. This has the dual purpose of keeping the refrigerating equipment clean and reducing the amount of natural circulation of soil throughout the kitchen.

The new type of filter is chemically treated with a germicidal chemical designed to retard the growth of bacteria trapped in the filter, including those which cause odor-forming mildew.

When Whirlpool purchased the facilities and patents of Servel in January, 1958, it announced a three-year program of engineering and research to create a gas refrigerator that would be comparable in efficiency and features to its electric model. Now, after less than two years of intensive development and reported multi-million dollar expenditure in research and engineering, a line of three completely new RCA Whirlpool gas refrigerator-freezers is currently being introduced to the trade and the public.

Urethane foam insulation

Foamed-in-place insulation is used throughout the gas refrigerator cabinet. The wall thickness has been reduced from 4 and 4½ inches (in varied areas) to 2¾ inches throughout the cabinet. Even with the urethane type of insulation as used, the practice of vapor sealing the cabinet is continued. Another point made in connection with the foamed-in-place insulation is that the structural strength of the cabinet is greatly increased, eliminating any tendency to distortion in the cabinet body. Engineers anticipate reduced damage to liners, because of the fact that there are no individual supports of the liner at the front of the cabinet as required with conventional insulation.

Refrigerant control system

The control is a conventional snap action electric thermostat. It is a single pole, double throw switch and controls the gas input valves. The control "bulb" or capillary is located on the refrigerator section evaporator. The control is a constant cut-in temperature control which gives cyclic defrosting of the refrigerator evaporator.

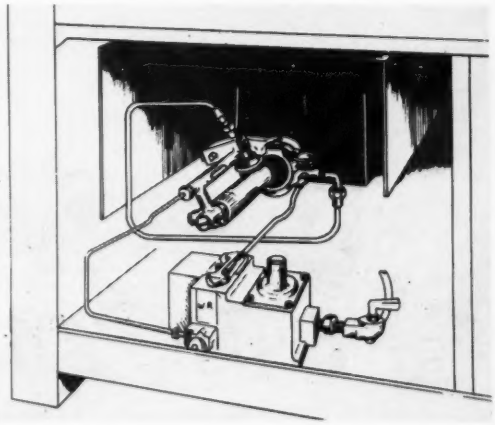
When the control calls for refrigeration, the maximum flow valve is opened and the unit operates on maximum flame. When the control is satisfied, the maximum flow valve closes and the intermediate flow valve opens. The flow through this valve is set to give sufficient refrigerant to the freezer evaporator, but rob the refrigerator evaporator. On power failure, both gas valves close and the flame drops back to a low input pilot flame.

As a safety feature, a second bimetal thermostat remains open under normal operating conditions, but will close when overheated. This arrangement prevents any excessive CO or CO_2 production under all conditions of poor combustion operation.

For example, if a fan were to cut out, or if a flue were to get stopped up through some abnormal condition, the resulting abnormal flame, resulting from the lack of engineered draft, causes the bimetallic thermostat to close and shut off the main gas supply. Should the

to Page 80 →

Exterior view of burner and electric gas control valve shown in drawings D & E.



An advance toward "programming" gas range ovens

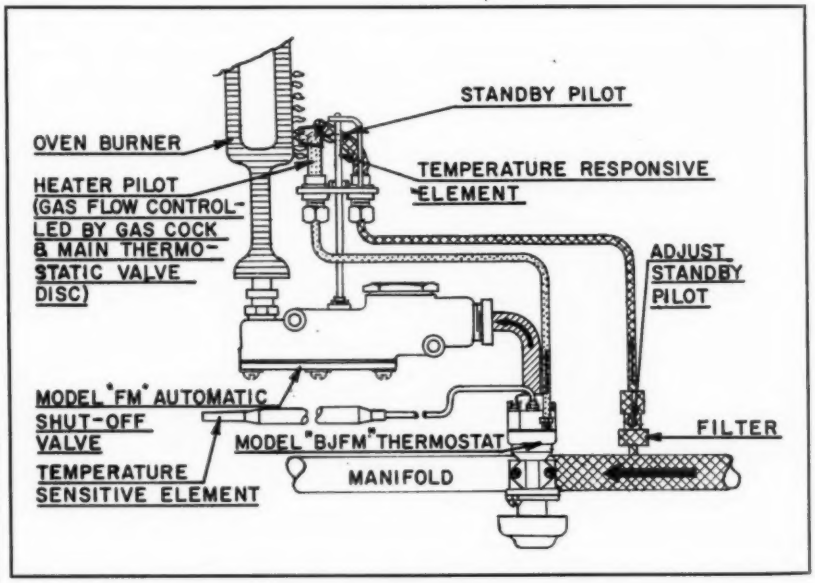
A RECENTLY ANNOUNCED control system for gas range ovens provides for food to be held at warming temperatures without cooking. For example, a roast may be cooked to the desired "doneness" (rare, medium, or well) and held at serving temperature without continuing to cook. The practical advantage for the homemaker in this control system is the opportunity to prepare a complete meal in advance and hold it at serving temperature.

While a normal "low" temperature under earlier control systems might be considered 250° F. or higher, the new system reduces the minimum setting to 140° F., which is said to permit food warming for extended periods without affecting palatability. The new temperature range is also suggested for defrosting frozen foods without pre-cooking.

The cycling process takes place only at temperature settings of less than 325° F. This method of complete interruption of the main burner flame is considered by Robertshaw-Fulton engineers to be the only way to obtain temperature control in the gas range oven with a minimum of temperature variation.

to Page 82 →

The new low-temperature oven control system makes possible preparation of an entire meal in advance and holding food at proper serving temperature.



OPERATION OF NEW LOW TEMPERATURE OVEN CONTROL

When oven is set for a temperature below 325° F., the control system allows full flame from the main burner until the oven approaches the desired temperature. Then the control shifts gas to a reduced by-pass flow. At the same time, the heater pilot is extinguished, allowing the temperature-responsive element to cool and shut off all gas to the main burner.

As the oven cools slightly, the main thermostatic valve begins to open, allowing gas to flow to the heater pilot. After a short time lapse, the automatic valve reopens, once more permitting flow to the main burner.

For quick, positive re-ignition, the system allows a substantial, sudden flow of gas to the main burner in an amount almost twice that of the by-pass gas. The oven then quickly reheats to the set temperature, and the cycle is repeated.

MODERN DROP-THROUGH METHOD SPEEDS DIE-CASTING PRODUCTION BY 50%

Brown-Lipe-Chapin eliminates manual handling with mechanical ejection of hot die castings.

Here's a typical example of how Brown-Lipe-Chapin engineers put quality into your die cast parts.

After the die casting cycle, castings are ejected automatically into a quench, where a conveyor takes them to the trim press. This modern method of die casting allows a maximum operating rate and boosts the over-all production rate by 50%. Also, casting uniformity is assured because the cycle time is constant and unaffected by operator fatigue or other human factors.

This is just one of the many outstanding features of Brown-Lipe-Chapin die casting facilities that can help make your product better and to more rigid quality standards.

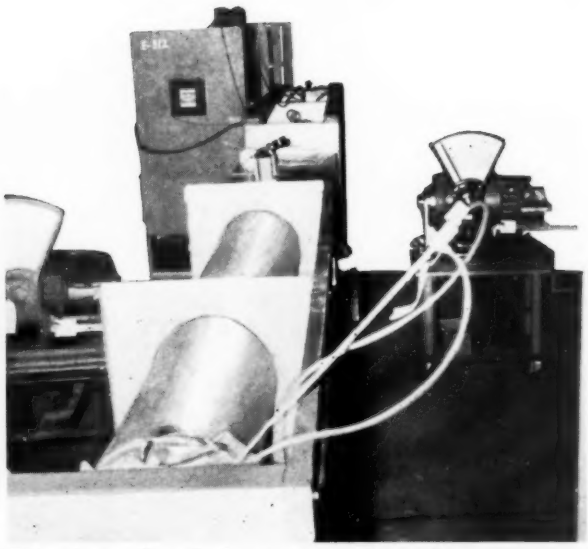
Under the same roof are facilities for metal stamping, anodizing, electroplating, buffing and polishing, precision painting, plus complete engineering service. And two Brown-Lipe-Chapin plants, strategically located in Elyria, Ohio and Syracuse, New York, offer the same complete facilities. For further information, call or write Brown-Lipe-Chapin, Syracuse, New York.

GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION

Unit in center is connected with two ducts for checking air flow both on evaporating and condensing sides. Monometers on top indicate proper head and suction pressures for refrigerant.



This view, taken during test procedure, shows air gauge for duct. Both impellers have been driven by separate dynamometers.

How to determine the performance of direct-connected blowers

performance charts based on test data are used as timesavers in component selection

SELECTING THE PROPER direct drive blower and motor combination to obtain the required cfm for a particular application crops up with increasing frequency.

In the case of belt-driven blowers, a certain amount of flexibility is provided by utilizing various pulley combinations. These give almost a free hand in selecting motors within the required horsepower rating.

The selection of the motor with a direct-connected blower should not, however, be based solely on the horsepower rating of the motor. As integral parts of the equipment, blower and motor must be carefully matched to achieve the required performance with utmost economy.

A case history

A case in point is the experience of Parker-Air Manufacturing, Inc., Loudonville, Ohio. For its packaged air conditioner, the company required 2,000 cfm through the condenser and 800 to 840 cfm through the evaporator at one-inch external static pressure.

It was necessary to maintain 260 pounds gauge head pressure at 95° ambient in the condenser and approximately 73 pounds gauge suction pressure at 80° return air.

Another qualification concerned amperage; the total for both blower and compressor was not to exceed 16-17 amperes.

In addition, and of prime importance, definite physical limitations could not be exceeded, due to the limited space permitted by the design of the air conditioning unit.

First, the internal pressure drop for both units, due to the cabinets and the coils, was determined. Then both blowers were driven under the same operating characteristics under which the unit would work — the only exception being that the blowers were driven by dynamometer drives. In this way the speeds and torques needed to maintain the required head and suction pressures by the right amount of air delivery were determined.

Next, the blowers and motors were matched according to the blower performance characteristics. The results obtained were: on the evaporator side, 820 cfm against one-inch external static; on the condenser side, 1900 cfm against .05-inch external static. The blower was below dimensional limitations and all other requirements were met.

A valuable aid in achieving these results was the set of blower curves published by the supplier of direct-connected blower assemblies. Determined by dynamometer tests, the curves are plotted in cubic feet per minute of air delivery versus static pressure in inches of water.

To save tedious computations in the application of this data, a complete family of performance curves for constant rpm is given for most units.

The requirements for the driving motor are plotted on the same engineering sheet in terms of torque (ounce feet) versus cfm. Obviously, each constant rpm blower performance curve has to be related with the analogous constant rpm torque curve.

Selecting the unit

Before selecting a unit for a particular application, it must first be decided which of the components has precedence over the other; that is, should the motor be matched to the blower wheel or vice versa.

Assuming that the motor should be matched to the blower and that the motor is to be matched with a blower assembly indicated as 93-9, here is the way the combination of blower and motor information should be handled: From the motor performance sheet for this example only, the speed (rpm) versus torque (ounce feet) is of importance. We are to determine the torque of the motor in the area from 1100 to 900 rpm in increments of 50 rpm, with the

respective points on the motor-performance curve being marked A to E. The values as tabulated are:

	Speed, rpm	Torque, Ounce Feet
A	1100	17.6
B	1050	21.6
C	1000	23.2
D	950	23.5
E	900	23.0

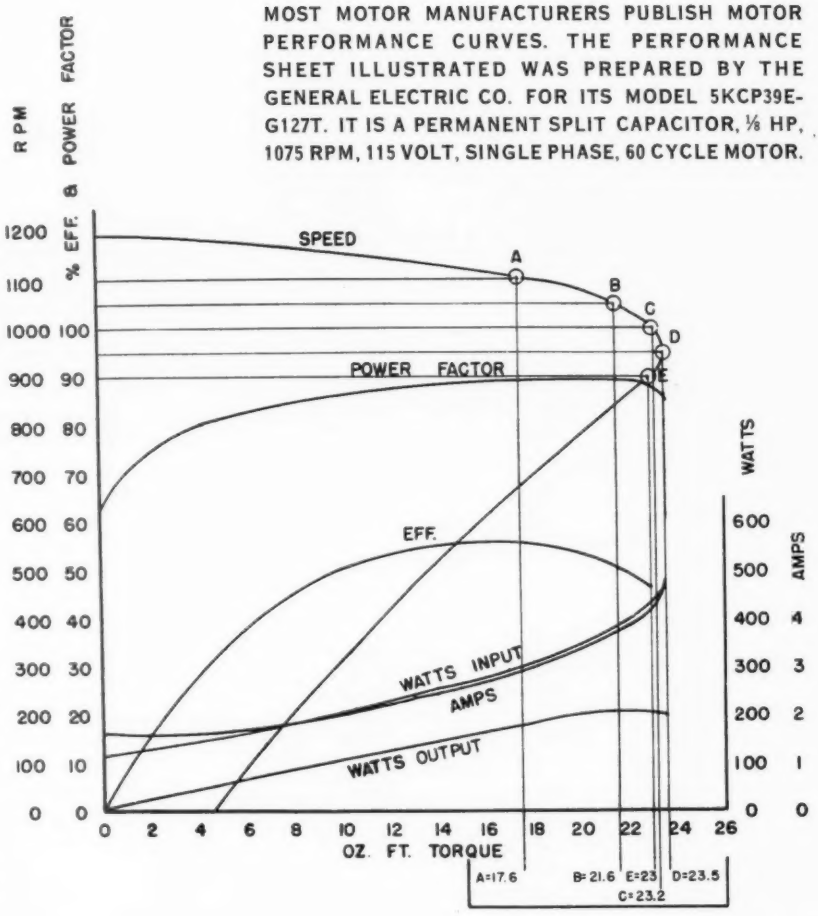
Referring to blower performance chart 955-149, for the 93-9 blower assembly, select the proper values of torque at the right side of the sheet. Draw a horizontal search line to the constant rpm torque curves.

For example, for the torque value of 17.6 ounce feet, we have to follow the search line to the 1100 rpm torque curve. From the intersection between search line and torque curve, we draw a second search line vertically until we intersect the corresponding cfm versus sp curve. Here we find point A. All other points are determined in a similar manner. For values between the constant rpm curves, interpolate; for example for 1050 and 950 rpm.

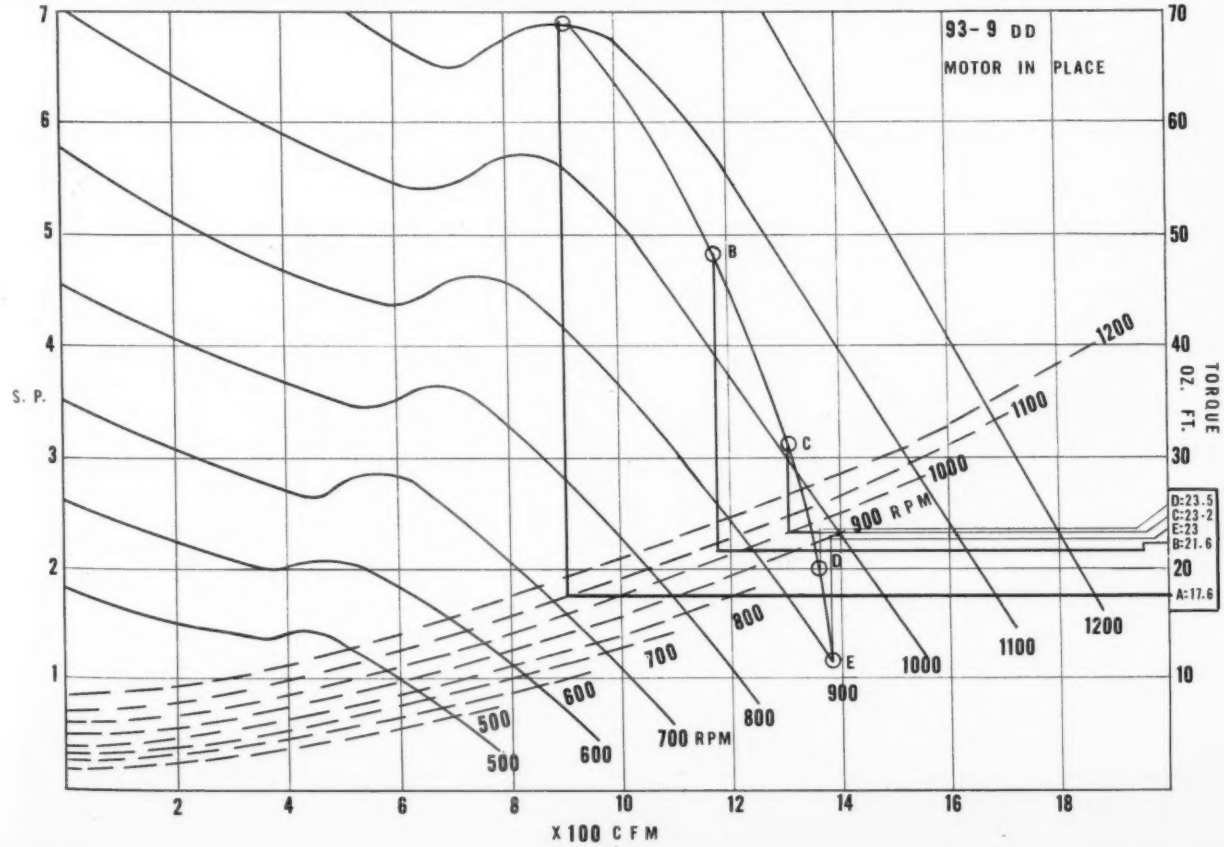
The performance of the direct-connected blower-motor combination can be established in terms of cfm versus static by connecting the determined points A to E.

EDITOR'S NOTE: The technical data and illustrations for this article were supplied by Peter Kardos, Chief Engineer, Morrison Products, Inc.

MOST MOTOR MANUFACTURERS PUBLISH MOTOR PERFORMANCE CURVES. THE PERFORMANCE SHEET ILLUSTRATED WAS PREPARED BY THE GENERAL ELECTRIC CO. FOR ITS MODEL 5KCP39E-G127T. IT IS A PERMANENT SPLIT CAPACITOR, ⅓ HP, 1075 RPM, 115 VOLT, SINGLE PHASE, 60 CYCLE MOTOR.



BLOWER PERFORMANCE CHART 955-149 FOR 93-9 BLOWER ASSEMBLY



A new plant fo in

SMOOT-HOLMAN COMPANY has just opened a new plant in Southern California for the production of industrial and commercial lighting fixtures. Company management is confident its lengthy identification with the latest and best products and methods in the commercial and industrial lighting fixture industry will be greatly enhanced.

The new plant, of latest design and layout, features a metal-preparation and finishing line which is semi-automated and makes possible high volume at low production cost. It is part of a seven-acre site with 140,000 square feet of floor area, manned by 252 employees. The location is 321 N. Eucalyptus Avenue, Inglewood.

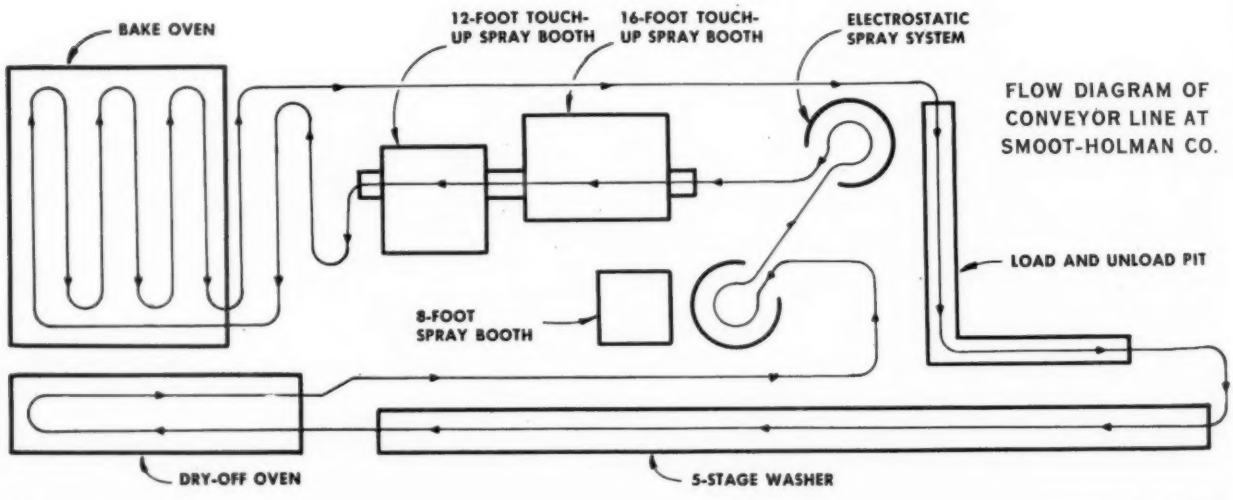
What is now Smoot-Holman began in 1914 when C. E. Smoot started in the field of producing enameled cooking ware, tubs, sinks, store-fronts, etc., under the name American Stamping and Enameling Co. In 1921, when George Holman joined the company, the production of lighting fixtures was undertaken.

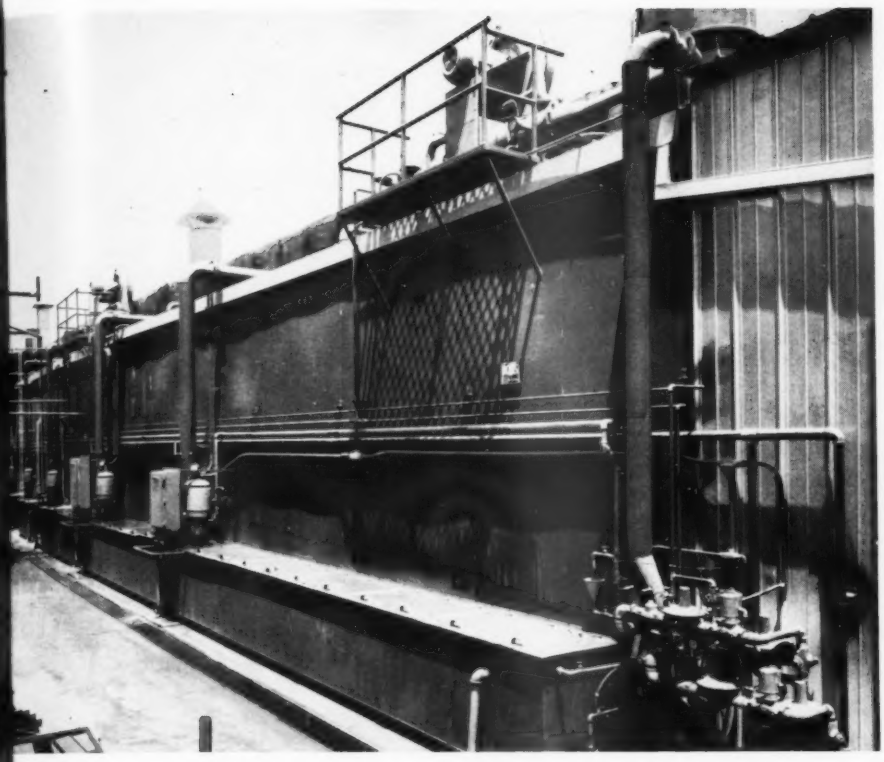
The advent of fluorescent lamps paved the way for organic finishing commercial lighting fixtures. At the time A. E. Clark and Leonard Hobbs joined Smoot-Holman, a complete line of business and industrial lighting fixtures was designed and produced.

Smoot-Holman started production of organic finished fixtures in 1942, and eventually fixtures with organic finishes became 65 per cent of the total plant production. Existing facilities were being forced to produce far beyond rated capacity, and additional facilities became a pressing need.

Replacement of the organic finishing plant with a completely new system of latest design was decided upon as a means of safeguarding the company's position as a producer of top-quality products at competitive prices. Objectives included substantial increases in production per time unit, with reductions in labor and material costs. Other considerations were the choice of equipment to provide superior performance for metal preparation, dry-off, painting, and paint baking, to include great flexi-

Hanging parts on main conveyor for start of washing and phosphatizing cycle.





Exterior view of five-stage washing and metal preparation machine. The first three of five washer stages are heated by gas-fired immersion tubes.

finishing lighting fixtures

close temperature control, electrostatic coating, and a pressurized plant are features of new Smoot-Holman installation

bility in temperature and time control, and permit the use of a wide range of materials.

System features flexibility

Outstanding features of the new system include the dry-off oven, which provides accurate time-temperature control; the bake oven, which maintains uniformly fine quality; and the great flexibility and capacity of the system.

The management is gratified that the original objectives of improved quality, increased production, reduced costs, superior performance, and flexibility, with sufficient capacity to accommodate foreseeable future demands, have been met.

From raw metal to assembly

After parts are prepared on a loading makeup conveyor, they are transferred to the main conveyor. Alternate conveyor line hangers — one rotating and the next non-rotating — permit flexibility in matching finishing requirements of the particular parts being processed to the conveyor system.

A metal part, hung on the main conveyor, first passes through a five-stage washer. This involves, in succession, the following tanks: cleaner, rinse, phosphate, rinse, chrome-rinse, and the dry-off oven. The first three of the five washer stages are heated by gas-fired immersion tubes.

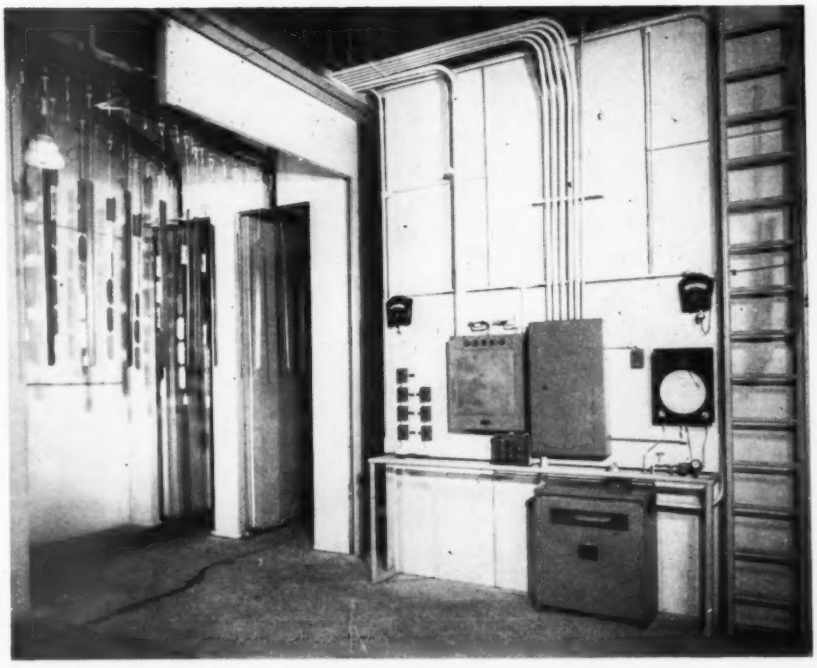
The dry-off oven obtains its heat by waste heat from the washer. The dry-off oven heat is thermostatically controlled, as are all heated stages of the system.

Finishing procedure

First the parts progress through two electrostatic automatic finishing stages, and two manual reinforcing booths to finish certain parts which are inaccessible to the automatic spray. In addition, a stationary manual booth is incorporated in the system for special work.

A vital factor in attaining an immaculate finish is the extreme cleanliness of the entire area. The whole system, including the building, was designed with dust control in mind.

to next Page →



(Right) — Ware is leaving the washing machine at extreme left. Entrance and exit to the dry-off oven are in center.

Pressurized building

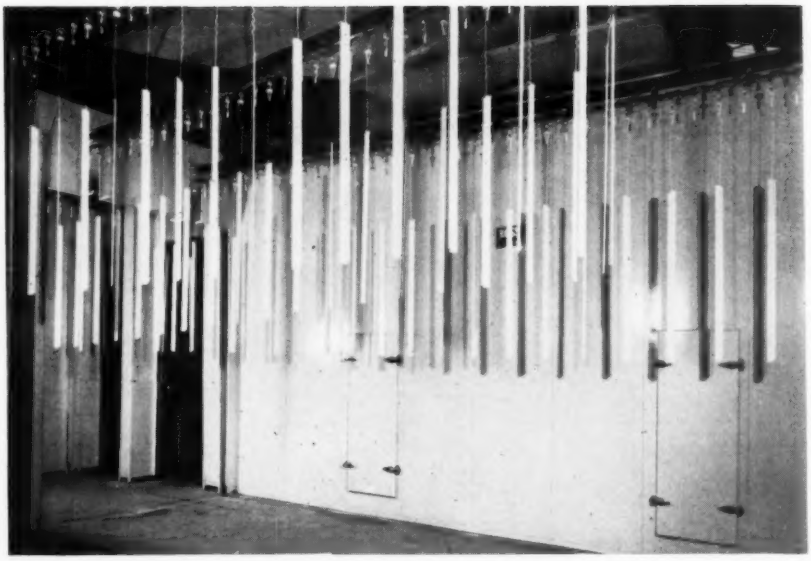
Air is supplied to the building under positive pressure from a blower system which delivers 80,000 cubic feet of fresh air per minute. The air is filtered to remove dust and dirt before it can enter the building.

By keeping the building under positive internal pressure, the admission of dust-laden air from the outside is kept to a minimum. In order to insure optimum conditions for finish applications, the air temperature is brought to a suitable range by means of a gas heating system incorporated within the fresh air blower room.

After the finish is applied, the part moves through a flash-off station, then travels 180 feet through the gas-fired oven. In this oven, the finished parts are brought to a temperature which is usually set between 300 and 325° F. The accuracy of temperature control accomplished by this oven plays a major part in the durability and appearance of the finished surfaces.

As the work emerges from the bake oven, it next progresses along a 118-foot conveyor section which acts as a cooling zone, allowing the temperature of the parts to drop to a point where they can be handled.

The combustion systems are supplied by dual fuel units. There are two dual fuel units on the washer, one on the oven, and one on the air makeup system.



Freshly painted parts in foreground are entering the gas-fired bake oven through the left door. Baked parts are emerging in the background.

Average production in an eight-hour day is 25,000 square feet of finished surface. The number of parts handled may range from 4,000 to 12,000 per day, depending on size.

William G. Holman, president, and Joseph A. Disario, production manager, state that Smoot-Holman's management is proud of the new plant's capacity for rigid control of all factors involved in producing maximum quality work at high speed and low cost. From the human standpoint too, the new plant yields dividends of improved cleanliness and working conditions.

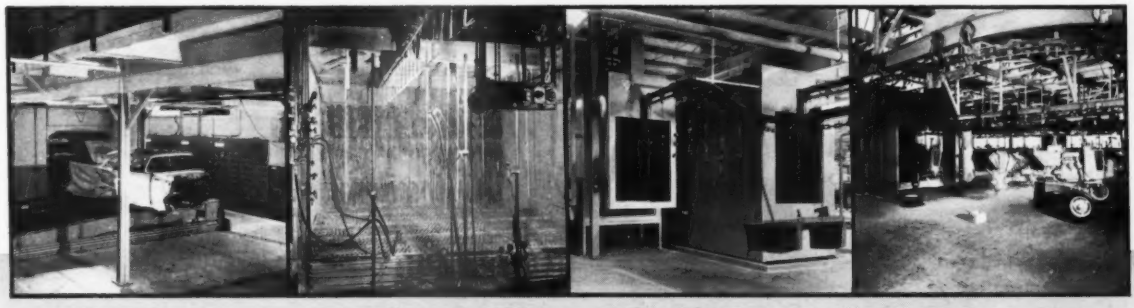
This feature is based on data and illustrations supplied by R. M. Owen, industrial engineer, Southern California Gas Co.

Prepared lighting fixtures after transfer from main to auxiliary conveyor, prior to manual spraying. Manual spray booth is at right background. At left are two booths on main conveyor.

From hair pins to rockets

Look into production savings possible with automatic

DESPATCH FINISHING SYSTEMS



Control panel along wall controls material flow through washing, rinsing, chromic acid treatment, finish coating on metal and finish baking.

Electro-static spray booth in finishing department of refrigerator manufacturer. Completely automatic control.

Small 3 stage washer and dry-off oven prepares small parts with maximum automation.

Finish Bake Oven in modern tractor plant shows programing of all components to expedite assembly at exit of Despatch baking oven.

When competition forces your prices down and you are casting around for a way to save your customers without losing your profit . . . look into your finishing department. For 20 years new synthetics have been altering requirements in finishing equipment. In more recent times new material handling methods have introduced new ways to organize finishing production to lower handling costs.

Through this finish production revolution, Despatch Engineers have maintained close contact with leading chemical research and development organizations. Our engineers have collaborated with basic metal manufacturers and finish coatings producers to develop processes in wide use today. Many of these developments are protected by Despatch patents.

Our 50 years in building heat processing equipment for American industry provide a dependable background for the latest scientific applications of automation in finishing systems. You will find our experience helpful in solving your problems of material handling, washing, chromic acid treatment, finish coatings, drying and baking of any product.

You will find our engineers resourceful in applying their information to improving your finishes and cutting your production costs.

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New Freon-sonic energy cleaning system

COMBINING THE ADVANTAGES of sonic energy with the use of Freon as the solvent, a new system for highly-critical cleaning applications was announced by Everett A. Sisson, manager of sonic energy products, Bendix Aviation Corp., Pioneer-Central Div., Davenport, Iowa.

For applications in which residual molecular film characteristic of chlorinated solvents, or contact with water cannot be tolerated, the new system offers particular quality and cost-saving benefits, according to Sisson. Its use is especially recommended for cleaning parts made from or containing beryllium, for ultra-precise electronic components, or for other parts or assemblies, which are incompatible with hydrous solutions, but require absolute elimination of contaminants.

The system can be secured with up to four or more cleaning stages: a Freon distillate flush, sonic energy clean, sonic energy rinse, and freon vapor rinse. Parts to be cleaned are first flushed with a portable lance which is fed through a filter from the distillate reservoir. The parts are then processed in sequence through sonic energy cleaning and rinsing and are placed in suspension over the distilling chamber for the vapor rinse cycle. Drying occurs almost instantaneously as the basket is raised above the vapor level.

The system is designed to provide an extremely-high level of solvent purity. Vapor from the distilling chamber is condensed on water-jacketed sidewalls of the cleaning compartment, and flows into the reservoir. It then cascades successively from the reservoir to the sonic energy cleaning chamber, to sonic energy rinse, and to solvent boiling chamber.

Other important design features include filtration through two-stage filtering units which remove solid contaminants down to one micron.

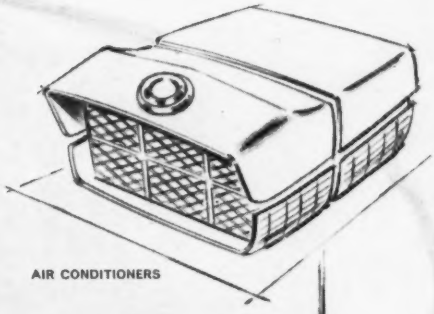
The complete system is housed in a stainless steel cabinet and is available in three different sizes, offering cleaning chambers, respectively, of 9 inches by fourteen inches, fourteen inches by twenty inches and 18 inches by twenty-five inches. Sonic energy is provided by special design Bendix magnetostrictive transducers, which have inherent characteristics of producing highly-reliable and efficient cleaning power under sustained production conditions.

Complete technical information on the new Bendix sonic energy Freon cleaning system may be obtained by writing to Dept. MPM, Sonic Energy Products, Bendix Aviation Corp., Pioneer-Central Div., Davenport, Iowa.

The complete system is housed in a stainless steel cabinet.

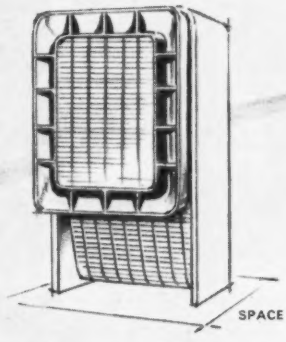
Idea! ... a world of inspiration with H&K perforated metals

TAPE RECORDERS



AIR CONDITIONERS

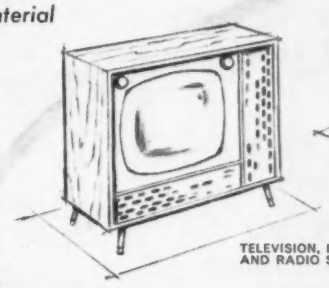
LIGHTING FIXTURES



SPACE HEATERS

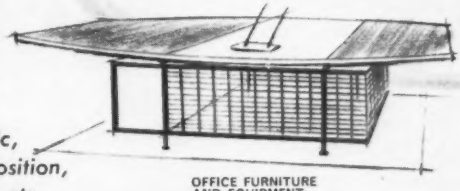
FURNITURE

Harrington & King can perforate the proper design, pattern and open area in practically any material available in coils, sheets or plates . . . from foil-thin to 1" thick.



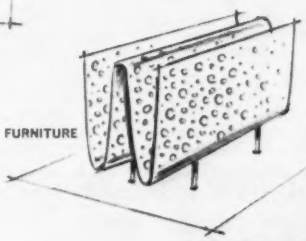
TELEVISION, HI-FI AND RADIO SETS

Metallic materials include steel, aluminum, stainless steel, brass, copper, monel, zinc, bronze, etc.



OFFICE FURNITURE AND EQUIPMENT

Non-Metallic materials include plastic, wood, composition, paper, cloth, etc.



NOVELTY FURNITURE

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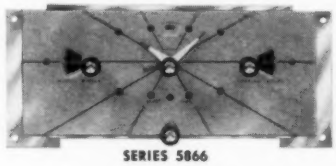

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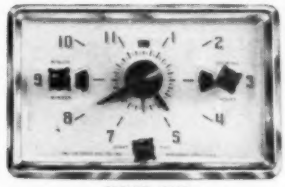

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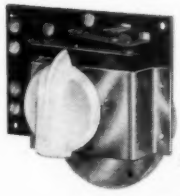

SERIES 7000

SERIES 5600

In any industry, the design engineer's demands are best satisfied by product lines that feature standout performance *and* wide application flexibility . . . which is what the Lux line features *exactly*.

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Fabricating the Hotpoint Space-Age refrigerator-freezer

EXCLUSIVE MPM PHOTO

new fabricating lines for cabinets and doors combine the speed of automatic transfer-type equipment with flexibility for varying model sizes

MPM EXCLUSIVE FEATURE

When the design of the new Hotpoint "Space-Age" refrigerator-freezer* was approved for production, it was decided that it was to be produced in 14 and 18-cubic-foot models. Production was to be continued on other sizes using conventional design and insulation. In the words of Nicholas A. Massello, manager of manufacturing engineering, "We were faced with the problem of continuing the manufacture of our conventional models, plus introducing the new line, without a loss of production and with very limited floor area with which to work. In our plant, we have area sufficient for one manufacturing line for each major component. We were not in position to wait for long changeovers between models, nor could we afford to have duplicate lines."

Two complete, new fabricating lines (one for outer shells (cabinets) and one for doors) answer this problem in the Hotpoint refrigerator plant. These lines are as completely automated as was considered feasible to retain the flexibility required.

THE NEW, AUTOMATIC TRANSFER FABRICATING LINES described in this article bear little resemblance to the original fabrication setup which was in operation in the "new" Hotpoint refrigeration plant when our editors covered this plant facility in the November, 1953 issue.

The new lines do serve to demonstrate what can be done when engineering brains and ingenuity are combined with capital investment to answer the problem of producing multiple products in limited manufacturing space.

THE EDITORS

For example, the cabinet starts with a 200-ton mechanical press brake used for blanking the sheets. From this point on, the outer case line has automatic transfer from station to station except for one transfer point where a sub-assembly line feeds the main line. The single sub-assembly line combines the cabinet bottom, filler panel, glide rails, and corner gussets. It is this use of the sub-assembly line for smaller component parts which make the straight line fabrication of the complete cabinet practical.

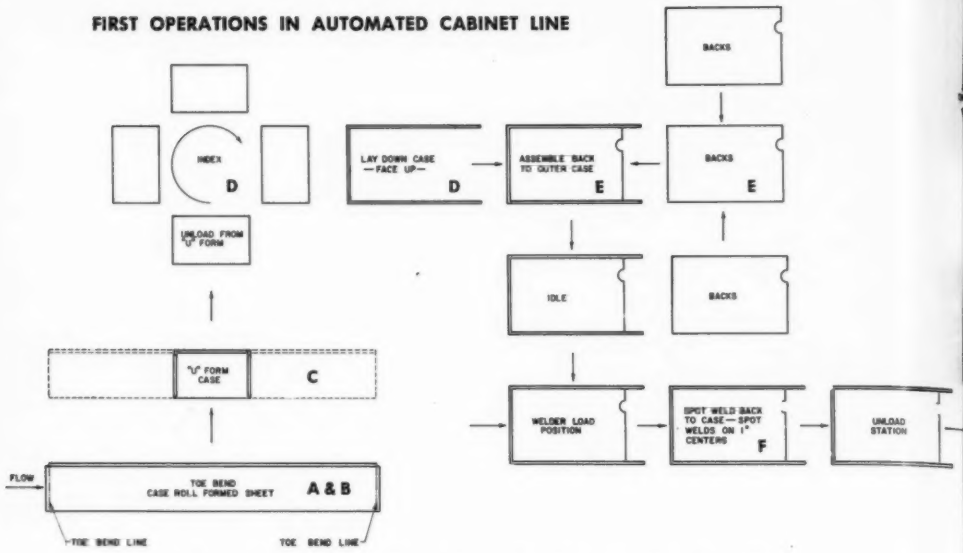
Sequence of fabrication — automatic cabinet line

On the cabinet or "outer case" line, the sheets are first blanked in the 200-ton press brake. They are then fed into a roll former, where front and back flanges are formed.

Traveling in a straight line on a motorized conveyor from the roll

(See "The Hotpoint Space-Age 18 refrigerator-freezer," a design feature in January, 1960 MPM.)

Sheets are blanked in 200-ton press brake and transferred to roll former for flange forming.



Steps A through F in drawing are keyed to corresponding photos.

former, the sheets feed into the first of two large, specially designed units for the initial cabinet forming and welding operations.

The first unit consists of two stations. The first station is used to toe-bend the case and skew-form the corners. The sheet is automatically transferred to the second position, where it is U-formed in a bender.

From this first unit, there is an automatic transfer to an indexing turntable, then to a laydown station. At the next station, the cabinet back is automatically fed into the U-formed unit. A vacuum-cup de-stacking mechanism is used to place the backs in position for feeding with a pusher unit.

From this station, the assembled U-formed unit and back are shuttled 90° to the welder load position, which in turn feeds a multiple-resistance spot welding machine for completing all necessary welds for the assembly of the back to the cabinet shell.

Three basic sizes can be fabricated and welded on the same line. Between the units just described for completing the outer case and back assembly, and the final welding and metal finishing line, there is a short section of conveyor where the single sub-assembly line feeds in.

Base sub-assembly line

The base sub-assembly (the cabinet bottom, filler panel, glide rails, and gussets) employs a series of five conventional spot welding machines, all fed manually. At the end of this five-welder line, the complete sub-assembly is ready to join the cabinets on the main line. Like the main cabinet line, this sub-assembly line is designed so that any width variation required in cabinet components can be handled without changeover.

Building up the base sub-assembly as a separate operation results in a minimum of parts being added to the subsequent automated line.

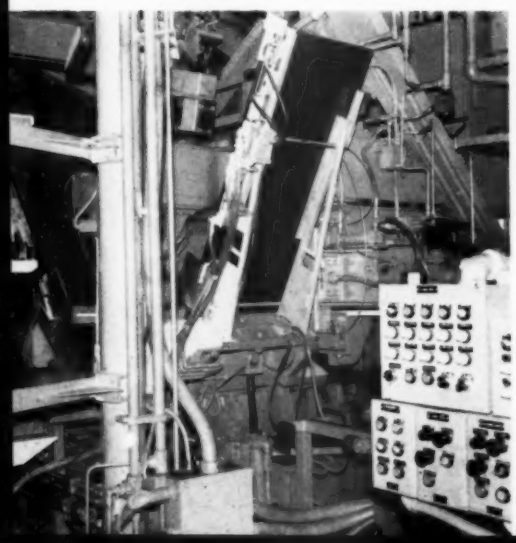
At the contact point on the main line, the sub-assembly is inserted into the outer cabinet. The single unit then approaches the final automatic transfer line for completion of the welding and metal finishing.

Cabinets travel in pairs

This section of the line demonstrates the ingenuity of the Hotpoint processing engineers, in providing a method of welding and automatic transfer that affords immediate changeover for varying cabinet sizes.

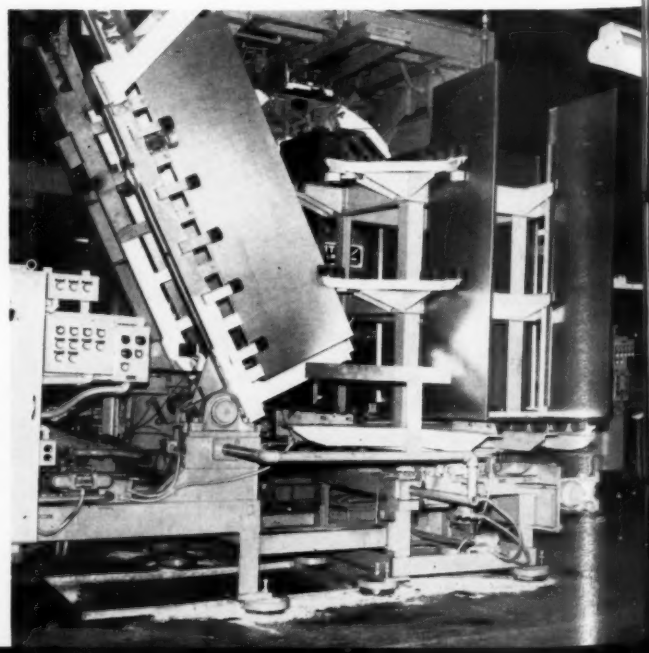
The answer lies in the design and arrangement of the equipment so that work is done on only one side or corner section of the cabinet at a time. The basic difference between this equipment and conventional equipment for the fab-

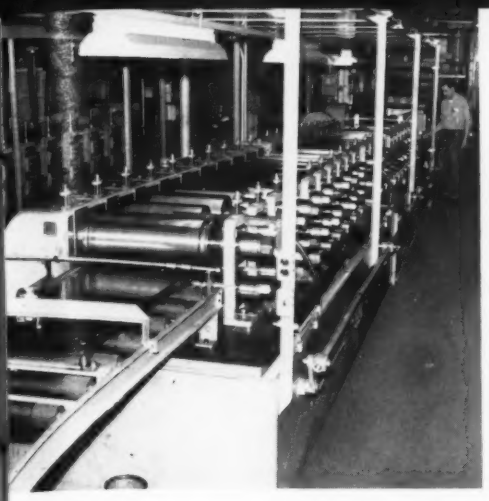
EXCLUSIVE MPM PHOTOS



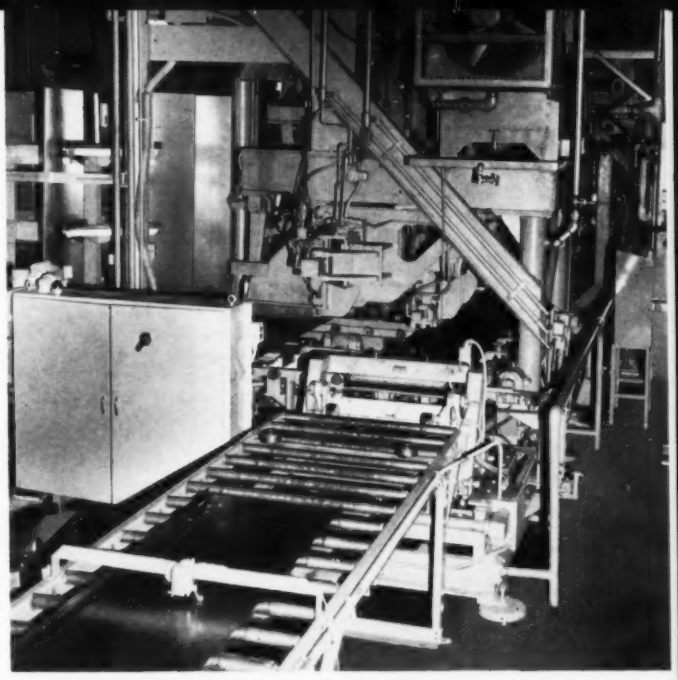
C — *(Left) — Next station of this fabrication unit with wings of bender in U-forming position.*

D—*(Right)—At right is indexing turntable following U-forming, and at left is lay-down station.*





A — *(Left) — Unload end of roll former showing cabinet sheet emerging with front and back flanges formed.*



B — *(Right) — The sheet now proceeds on a roller conveyor to a unit which toe-bends the cabinet and skew-forms the corners.*

rication of refrigerator cabinets is that the equipment is set up to handle cabinets in pairs. Then each machine, instead of welding both sides of a single cabinet, welds adjacent sides of two cabinets as they travel in pairs to each station. This makes it possible to discount the variation in widths and lengths that are necessary to run in the many designs of cabinets which Hotpoint produces.

Sequence of operations

A complete welding and metal finishing transfer-type machine has stations to perform a total of fourteen operations in pairs, plus a facility for a selective operation (piercing either right or left-hand hinge holes for doors).

Three welding stations are required to do the bottom welding. It is handled on a progressive basis, with automatic feeding in and out of the station and automatic transfer from station to station.

Station 1 — Operations 1 and 2, completed at Station 1, are welding of left and right-hand glide rail to toe front and rear flange of cabinet (24 spot welds).

Station 2 — Operations 3 and 4. In these operations, the bottom is welded to the back, and the glide rail and filler panel are welded to the cabinet flanges (24 spot welds).

Station 3 — Operations 5 and 6 consist of welding the right and left-hand lower gussets to the cabinet, welding the filler panel, and completing the welding of the right and left-hand filler panel to cabinet (8 spot welds).

Cabinets now remain in the same position on the transfer unit, and pass a series of five additional stations which are located on the opposite side of the transfer equipment. These five stations are working on the top end of the cabinet, and in the following sequence:

Station 4 — Operations 7 and 8 involve manually loading weld plates which are seam welded to the two top front corners. This includes welding the corner reinforcements and miter-seam welding the corner joint.

Station 5 — Operations 9 and 10 consist of coining the same two top front corners (to facilitate later metal finishing).

Station 6 — Operations 11 and 12 again concern the two top front corners, which are metal finished by manually-operated belt sanders.

Station 7 — Operation 13 pierces holes for left-hand doors, and Operation 14 pierces holes for right-hand doors. (The choice of right or left-hand punching is made by an electrical selector switch).

Station 8 — Operations 15 and 16 are for welding left and right-hand upper gussets. The gussets are manually loaded (8 spot welds).

Door line has equal flexibility

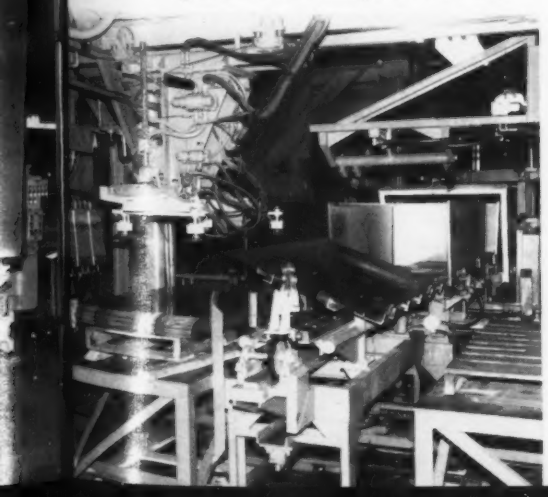
A high degree of flexibility also is provided in the door line as in the outer cabinet line. The variety of doors (seven in all) includes two basic designs for the 14 and 18-foot refrigerator; two for the 13-foot, two-door; one for the 13-foot, single-door; one for the 11-foot, single-door; and one for the 9-foot, single-door. In each instance, provision is made to fabricate for right or left-hand hardware.

At the start of the door line, there are one 600-ton and two 400-ton mechanical presses. Press #1 (600-ton, double-action crank-type) is a draw press; press #2 is for notching and piercing (a

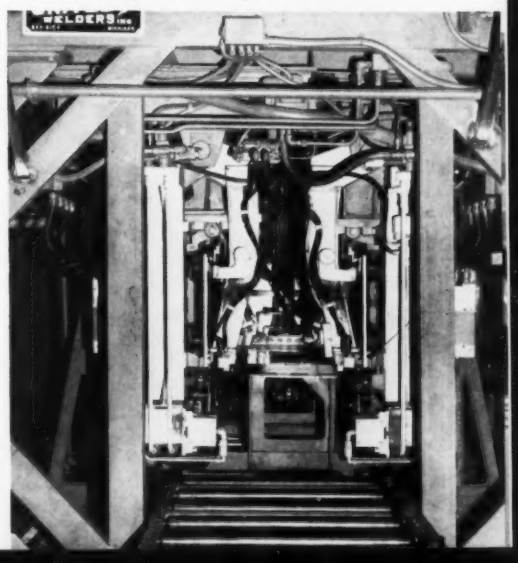
to Page 44 →

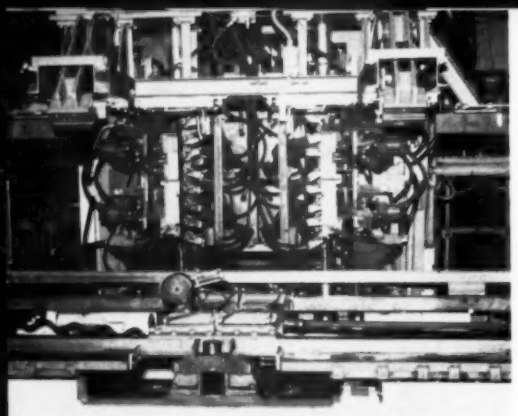
turn page for drawing and photos of cabinet line →

E — *Cabinet back in position to be automatically fed into U-formed unit in center background. Vacuum cup de-stacking device mounted on overhead monorail picks up backs from stacks on either side of back-feeding mechanism, which eliminates the problem of interrupting production to wait for a new stack.*



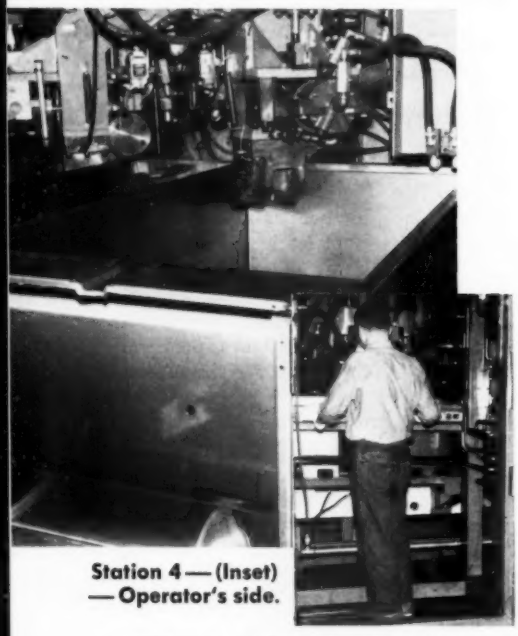
F — *Unload end of multiple resistance spot welding machine, which completes welding of back to cabinet. Conveyor in foreground feeds final automatic-transfer welding and metal finishing line.*





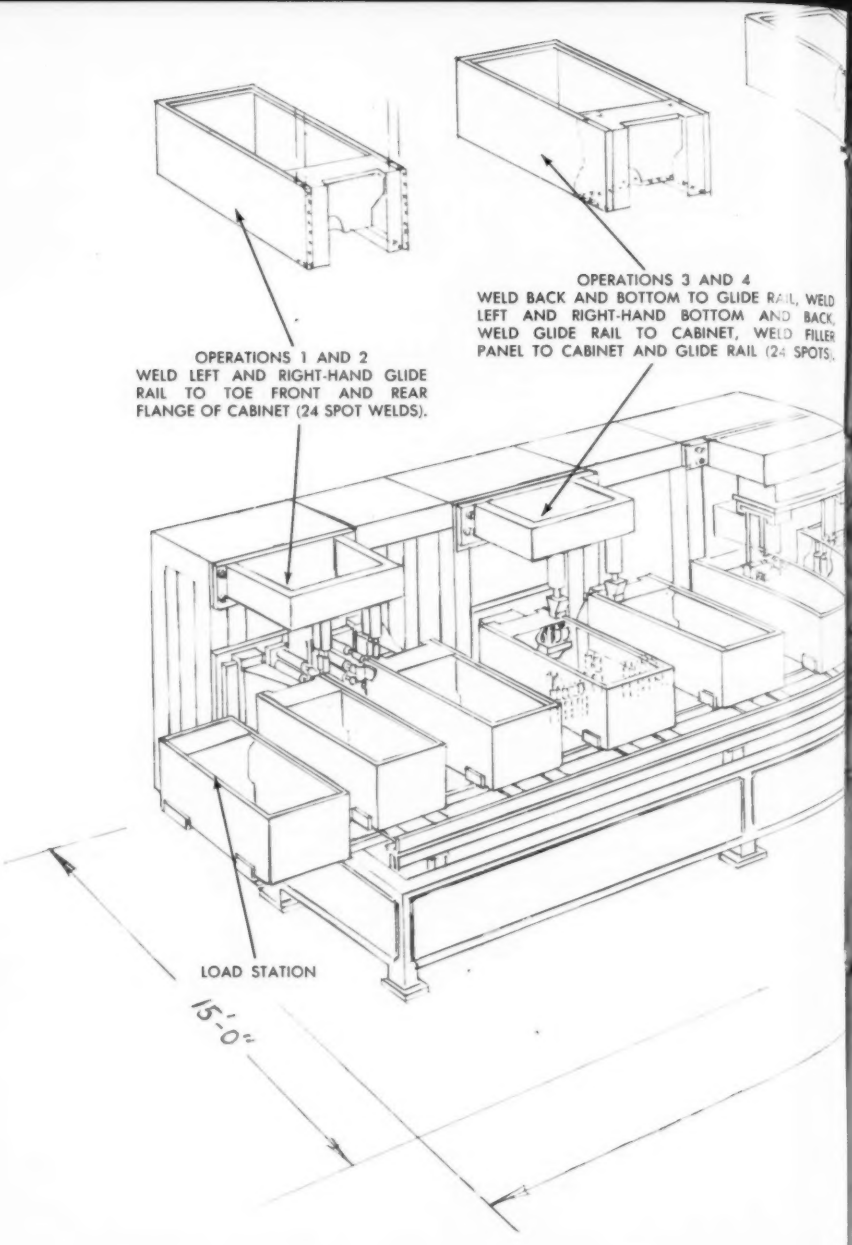
Station 1 — Operations 1 and 2
Two cabinets have been removed to show welding equipment and transfer mechanism.

[**Stations 2 and 3,** *which complete* **Operations 3 through 6,** *are similar to* **Station 1.**]

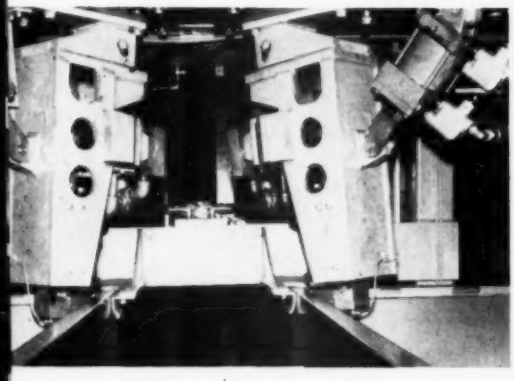


Station 4 — (Inset) — Operator's side.

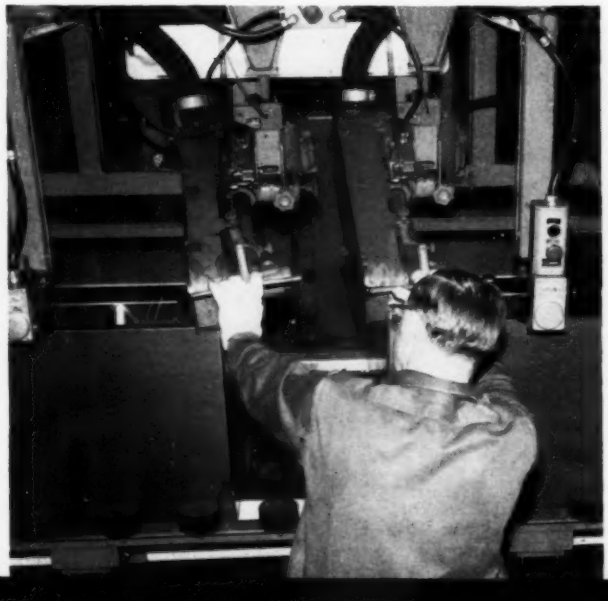
Station 4 — Operations 7 and 8



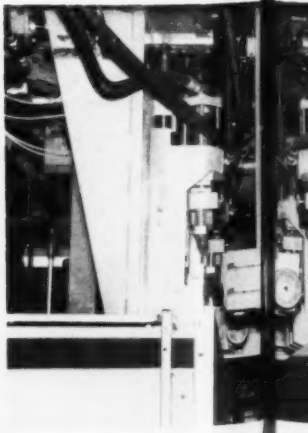
Station 5 — Operations 9 and 10



Station 6 — Operations 11 and 12
Manually operated belt sanders are used for rough grinding.

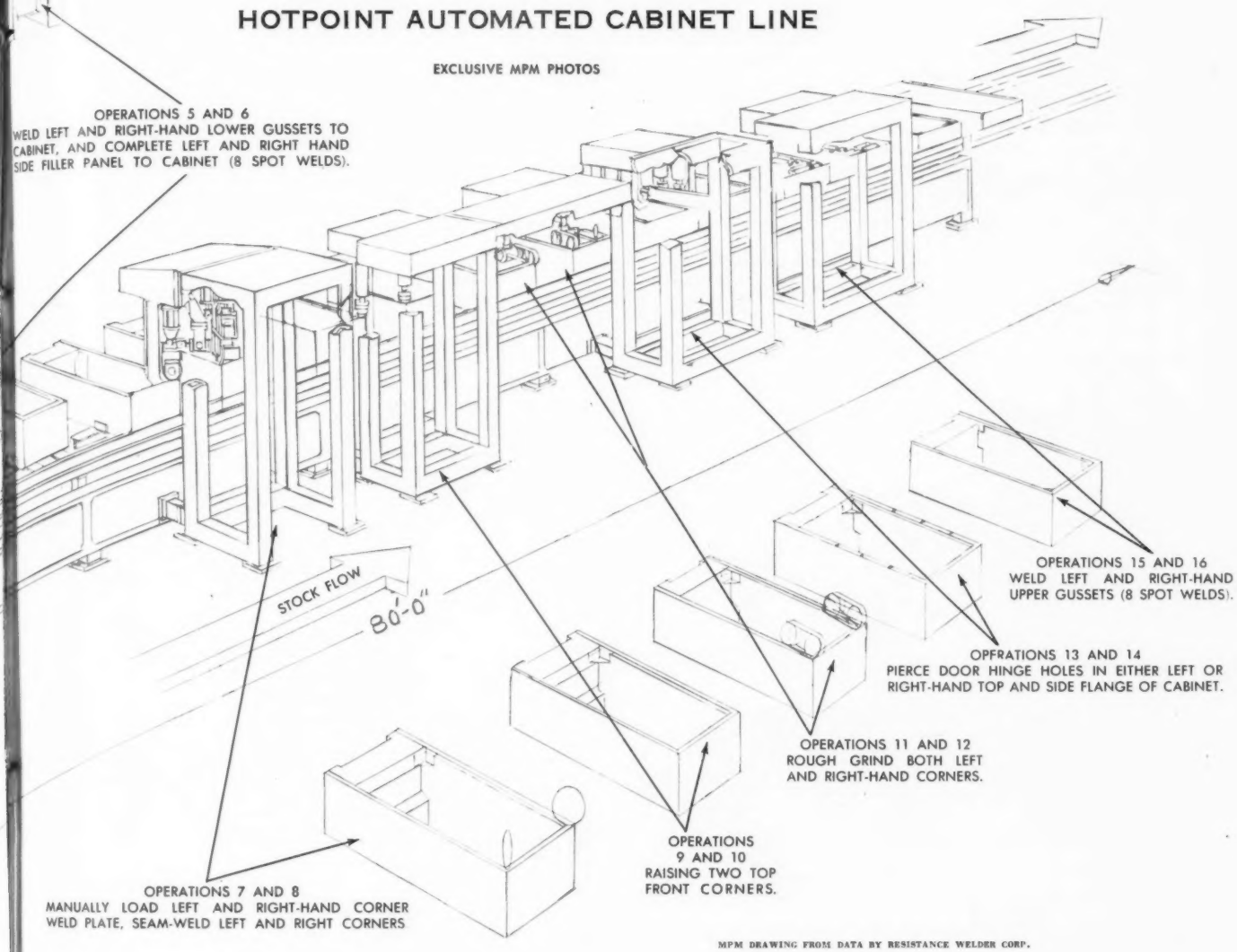


Station 7 — Operations 13

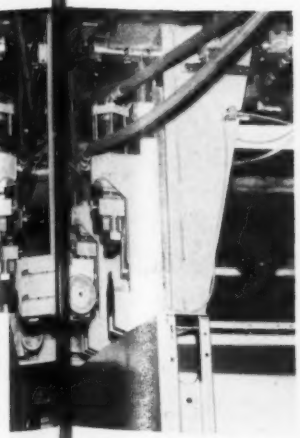


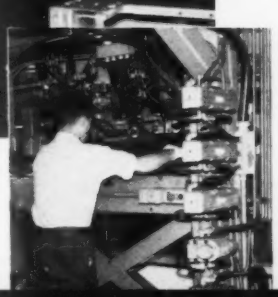
HOTPOINT AUTOMATED CABINET LINE

EXCLUSIVE MPM PHOTOS



MPM DRAWING FROM DATA BY RESISTANCE WELDER CORP.

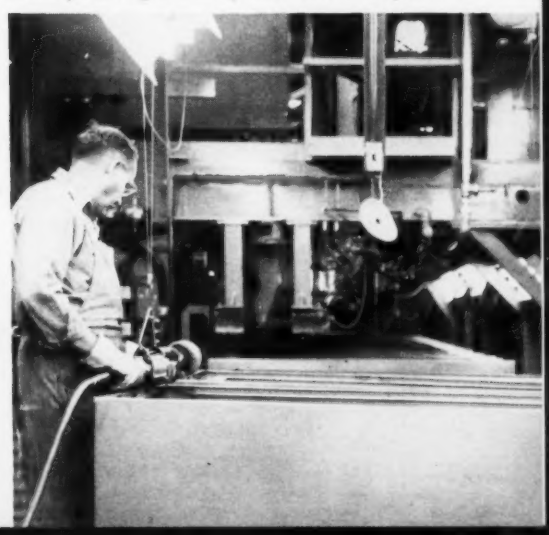




Station 8 — (Inset) — Operations 15 and 16

Station 8 — (Left) — Opposite side of conveyor.
Gusset has been welded in place.

Metal finishing at end of automatic-transfer line.



400-ton crank-type); and press #3 is a flange forming press (a 400-ton eccentric crank-type).

The doors then approach a 22-station, automatic transfer line for completing all remaining fabricating operations.

The first section of this line has six working stations and three idle stations. (The idle stations are provided for flexibility in later cabinet engineering). This is followed by a cross transfer to the second section, consisting of 12 stations, one of which is idle. Only one man is required along this 22-station setup; his job is to feed the door plate which is welded to the freezer door, when this type of unit is being run.

Like the cabinet line, the door line is designed so that all work is done at one end at a time. All sizes, irrespective of length or width, can be handled on the same equipment line.

The simplicity in changeover from one width door to another is indicated by the fact that the operator merely pushes a control button to shift the appropriate working heads and locaters.

For a typical door, five work stations are used on the first section of the line. Either Station 7 or Station 8 is used, depending on the model being run. Following is the sequence of operations:

Station 1 — Seam welding two mitered top corners.

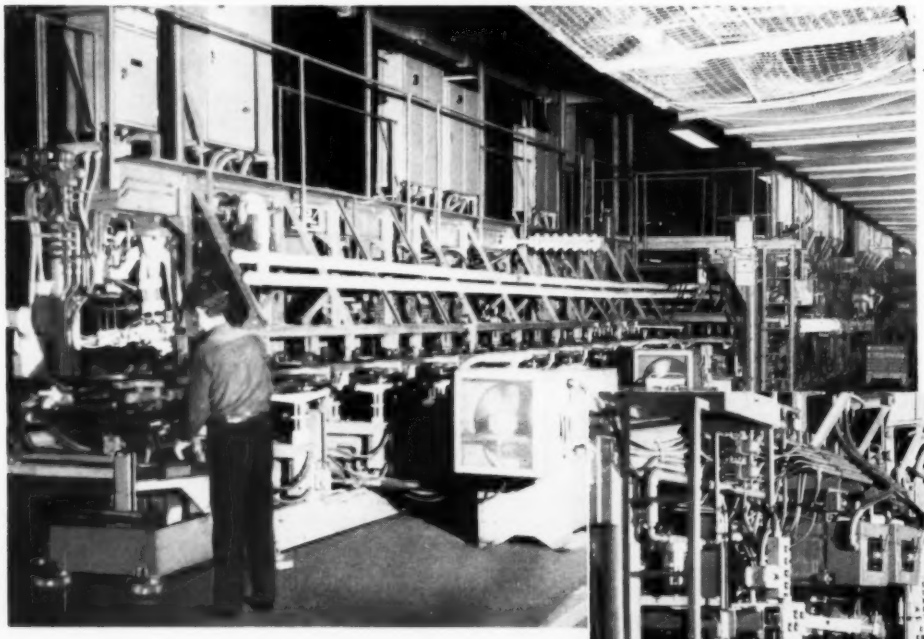
Station 2 — (Idle).

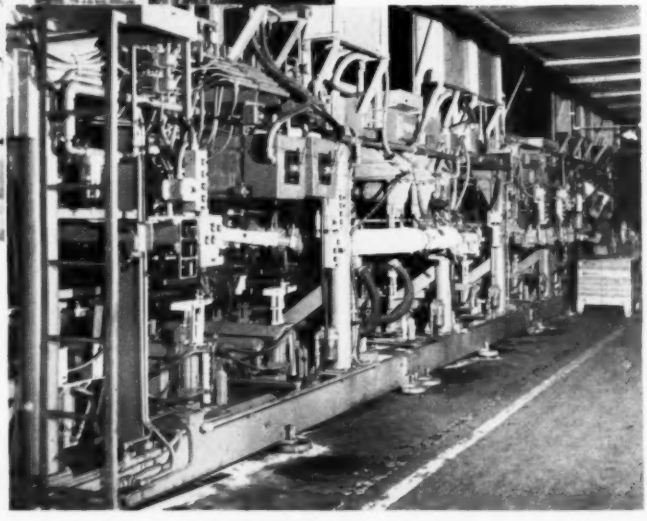
Station 3 — Metal finish two top corners (this metal finishing is automatically performed by an oscillating belt sander).

Station 4 — Pierce top hinge hole.

Station 5 — Extrude hinge pin hole.

to Page 77 →





"IT IS MY OPINION THAT OUR NEW 18-CUBIC FOOT REFRIGERATOR INCORPORATES SOME OF THE MOST FORWARD LOOKING ENGINEERING AND MANUFACTURING INNOVATIONS BROUGHT OUT DURING THE PAST TEN YEARS."

Marshall Payne, Manager of Manufacturing, Refrigeration Department, Hotpoint Division, General Electric Company.

EXCLUSIVE MPM PHOTOS

(Upper right) — Three mechanical presses precede automatic door line.

(Above) — Twenty-two station automatic transfer line for door fabrication. This line fabricates doors of seven different designs.

(Right) — Second section of door line consists of 12 stations, one of which is idle. Operator on this section installs a door plate which is welded to lower portion of door back.

To solve your toughest stripping problem

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 FIELD SERVICE MEN • OVER 160 MATERIALS

Strip any type of paint fast... even epoxies ...with modern Oakite strippers

Even your toughest paint-removal problems can be solved with Oakite strippers. A dozen alkaline and solvent-type removers and additives are available to satisfy all needs. In the fastest, most economical way, they enable you to get a clean, smooth surface for repainting.

Oakite strippers are available to fit every method of application including soak tank... brush... steam gun. Look at these typical results:

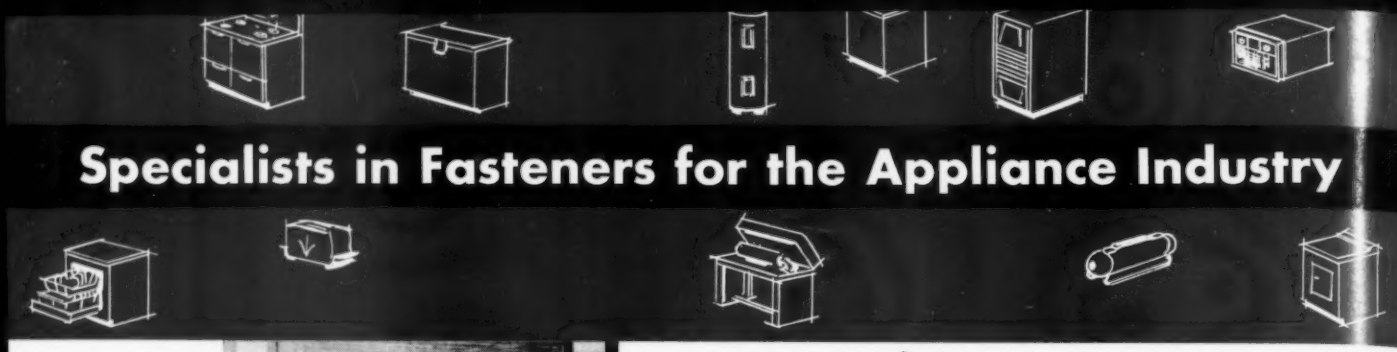
- Stripping rejected television cabinets of paint and phosphate coating took 25 minutes before the proper Oakite material eliminated three steps, slashing time to 10 minutes.
- An auto parts maker says that a continuous cycle of 1 minute and 50 seconds "works like a charm stripping paint and incidental rust from rejects and hooks."
- Brass plated steel parts were stripped of their epoxy finish in a matter of minutes.

For stripper recommendation, just tell us your paint removal problem—the base metal, the paint type, number of paint layers, size of items to be stripped. Or ask your local Oakite man. Send for bulletin. Oakite Products, Inc., 26 Rector Street, New York 6, N. Y.

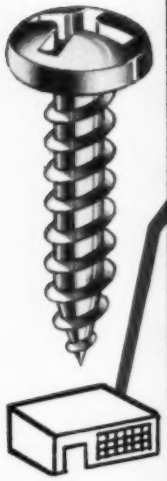
it PAYS to ask Oakite

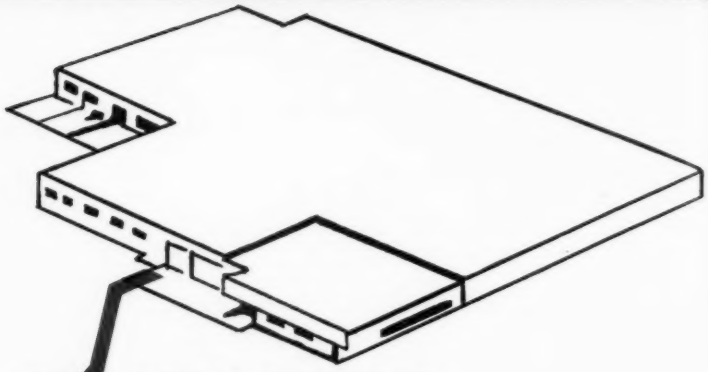
OAKITE

over 50 Est. 1909 SCIENCE years' leadership in industrial cleaning



Specialists in Fasteners for the Appliance Industry





10 YEARS OF GROWTH THROUGH INTEGRITY

Ten years is a long time—long enough for us to realize that our growth is due to the confidence our customers have placed in us, confidence that results from service, quality, dependability, personal interest . . . many things.

As we look to the future we recognize our continuing responsibility to you—to intensify our engineering and product development in order to carry on our original objectives . . . to manufacture quality fasteners and provide unsurpassed service.

We thank you for your confidence in the past decade, and assure you of our determination to continue to warrant your friendship in the years ahead.

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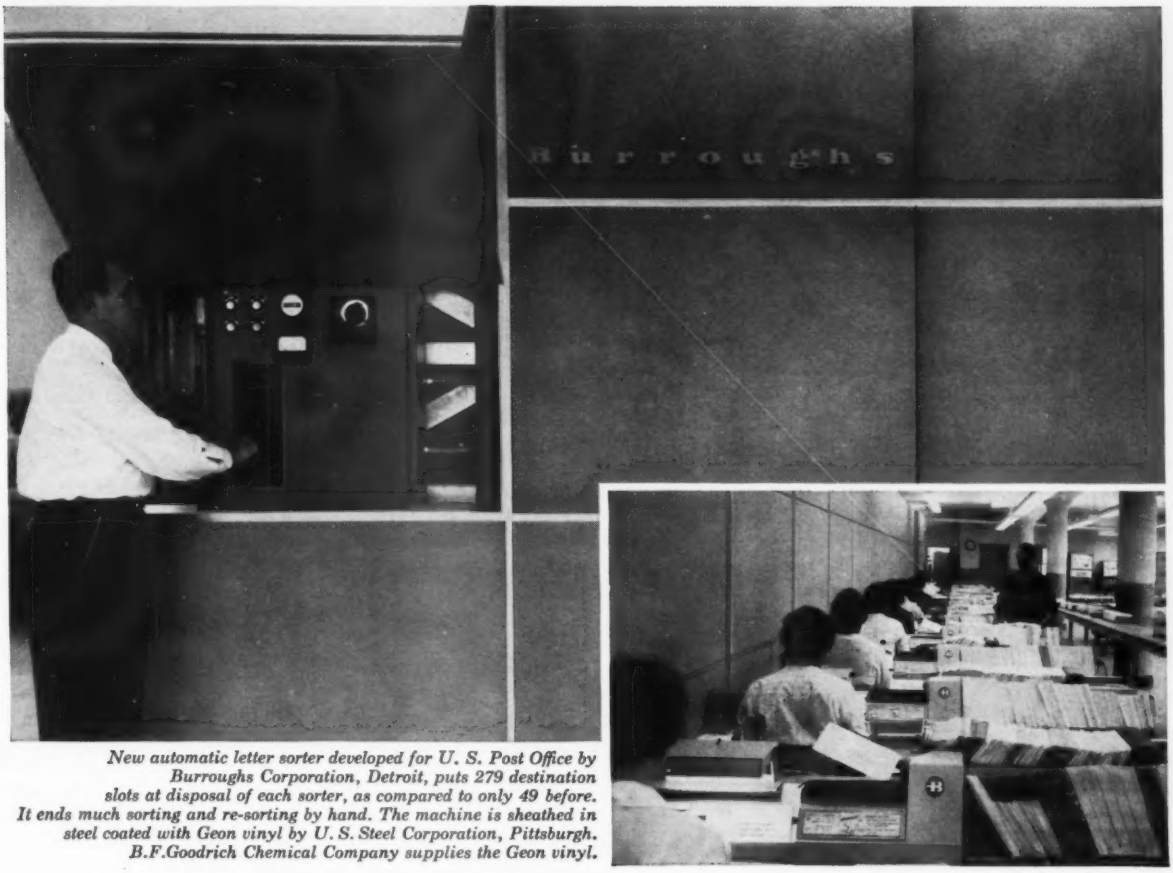


New automatic letter sorter developed for U. S. Post Office by Burroughs Corporation, Detroit, puts 279 destination slots at disposal of each sorter, as compared to only 49 before. It ends much sorting and re-sorting by hand. The machine is sheathed in steel coated with Geon vinyl by U. S. Steel Corporation, Pittsburgh. B.F.Goodrich Chemical Company supplies the Geon vinyl.

U.S. Mail sorting goes automatic

with new machine sheathed in steel coated with Geon vinyl

This new automatic mail sorter converts the age-old "peek and poke" hand method of sorting letters by destination to a smooth, 43,000 letters-per-hour sorting by machine. 78 feet long and 10 feet high, the machine is sheathed with a versatile new combination—steel coated with Geon vinyl.

The Geon coating provides a soft, pleasant look and feel. It can be washed. It won't scuff or stain. The color is permanent and the coating protects the steel against both wear and corrosion.

Geon-coated metals can be formed, bent, even projection-welded without damage to coatings. Products can be made to match the color combination or texture of almost any material.

Geon coatings also offer superior abrasion, electrical and chemical protection for the metal. It's another example of the way that versatile Geon is improving products and opening new markets. For more information, write Dept. GD-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Geon VINYLS

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

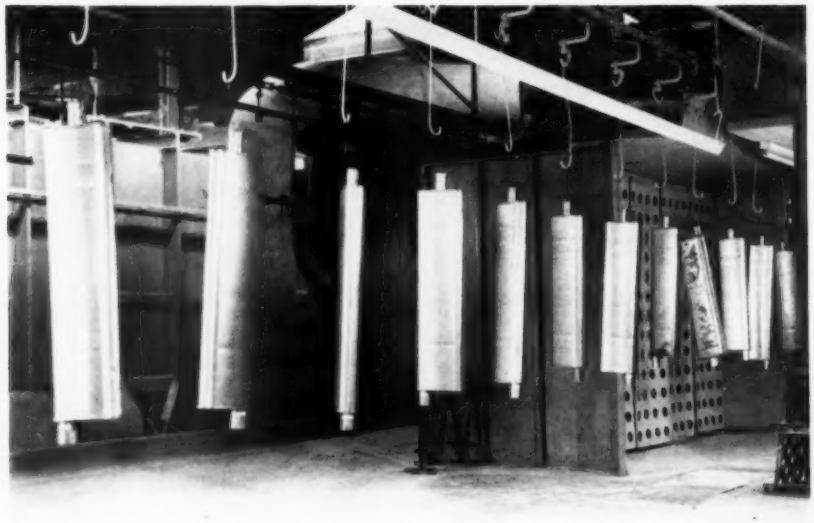
B.F.Goodrich

GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

First packaged service station delivered by Bettinger to Sun Oil Co. Located in Detroit, the new 1,300-sq. ft. two-bay unit was completely factory fabricated by the manufacturer, and required local contractors only for plumbing and utility service. Delivery time; two months.

(Below)—Pilot production run of mufflers ready for firing at high temperatures. Bettinger says fused-in coating of ceramic material is .003 to .004 inches thick, and can be applied to low alloy steels at a cost which will make "lifetime" mufflers available.

(Above) — Conventional and ceramic-coated mufflers after equivalent of 25,000 miles of operation.



(Left) — A recent installation of V-Corr, a corrugated porcelain-on-steel roofing and siding material on a nickel plating and salt heat treating building in Northern Ohio. Approximately 500 squares (50,000 sq. ft.) of 20-gauge gray V-Corr corrugated roofing were installed. This material replaced roofing which had deteriorated due to the attack of acid and salt fumes, and condensation collecting on the underside of the roof.

The decade ahead for

ten-year research and development progr

THE DECADE AHEAD will see the coming of age of architectural and industrial applications of porcelain enamel, corrosion-resistant ceramic coatings and high-temperature ceramic-coated metals, according to Robert A. Weaver, Jr., president of the Bettinger Corporation.

The Milford, Mass., processor and fabricator of ceramic-on-metal products believes that the past ten years of intensive technological research have provided the basic knowledge of material and processes required to make possible modern applications of both the centuries-old porcelain enamel art and the new technology of ceramic coatings.

Seven billion dollars for corrosion

"The $7 billion a year bill for corrosion could be tremendously reduced by known applications of the protective qualities of ceramic coatings," Weaver claims. "And 25 per cent of every plant

V-Corr ceramic-coated corrugated steel siding i mass-p

ad for ceramic coatings

ment program results in specific end uses for specialized materials

Nathaniel A. Cannistraro and Robert A. Weaver, Jr. examine two ceramic-coated parts for jet engines.

maintenance dollar which is spent for painting could be almost entirely eliminated."

Weaver outlined four major areas where the technological break-through has already been accomplished, and which would account for high volume during the 1960's: architectural application, both monumental buildings and residential construction; commercial, light industrial and heavy industrial applications; corrosion resistant products for industry; and high temperature "aero/space age" applications.

Architectural applications in curtain wall construction for monumental buildings is the most advanced of these, Weaver believes. However, prototype houses with porcelain enamel exteriors are now possible, and one model, by Bettinger's Canadian affiliate, Cerametals Industries, Limited, will be completed soon.

In the aero/space industries, *ceramic-coated jet power plant parts* and other high temperature parts are already in use. One very important offshoot of the research in this field, *a ceramic-coated automobile muffler*, has been submitted to the automobile companies for testing, and is expected to be available on 1961 models.

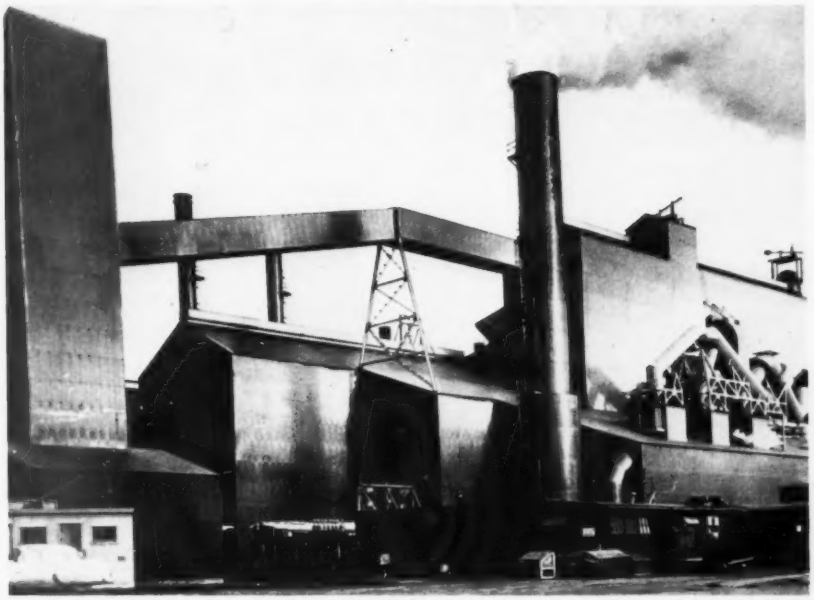
A modular-design packaged service station, introduced this year by Bettinger, has already undergone successful introduction with six major oil companies. Easy-to-maintain buildings for other multi-unit applications, such as laundries, miniature supermarkets, dairy farm buildings, and roadside restaurants, can be constructed competitively with other materials using the same basic principles.

In industrial construction, *a corrugated steel roofing and siding material* with a single-coat ceramic skin has proved out in the most corrosive applications of the metal working industries. Now available in a variety of colors, the material is adaptable to a high percentage of industrial building.

"The future looks very bright," Weaver stated. "When we embarked on our ten-year research and development program more than ten years ago, we knew only that we were working with an overlooked but versatile material. Now we have definite knowledge that the art of ceramic coating has exciting and very specific applications in modern industry."

iding is mass-produced in Bettinger's Toledo, Ohio plant.

Over 400,000 sq. ft. of ceramic-on-steel corrugated roofing and siding were installed at the Algoma plant in Sault St. Marie, Ontario. A similar installation is currently nearing completion at the U. S. Steel Company's new powerhouse at its Clairton, Pa. works.



NEW
INDUSTRIAL LITERATURE

Electrode Pocket Guide

New products and new engineering data have been added to the most recent edition of "Electrode Pocket Guide." The 64-page booklet contains complete information on all types of electrodes available from the company: mild steel, low alloy, low hydrogen, iron powder, stainless steel, hardfacing, nonferrous and cast iron. For a copy of the booklet write Dept. MPM, Air Reduction Sales Co. Div., Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y., and specify form ADC 650.

Producing Specialty Metal Products

A 24-page booklet describes the facilities available for engineering and production of specialty metal products. Facilities include tool and die making, forming, finishing, and assembly of all types of sheet, rod, and bar metals. Included in the booklet are illustrations and complete lists of equipment, typical products and installations. For a copy of the booklet, write Dept. MPM, Art Metal Construction Co., Contract Div., Jamestown, N. Y.

Electric Furnace Brazing

How and where to use electric furnace brazing is the subject of a 50-page bulletin. It covers such subjects as the *where* and *why* of furnace brazing, how to remove copper from steel after brazing, application and selection of brazing metal, selection of flux, strength of furnace-brazed parts, how to furnace-braze cast iron, and remedies for furnace-brazing ailments. Bulletin GEA-3193C may be obtained by writing to Dept. MPM, General Electric Co., Schenectady 5, N. Y.

Small Gearing Guide

A line of gears for fractional horsepower motors are described in "Small Gearing Guide." Included in the coverage are helical and spiral as well as fine and intermediate pitch gearing of all types. The guide contains specifications and charts. To obtain a copy, write Dept. MPM, Gear Specialties, Inc., 2635 W. Medill Ave., Chicago 47, Ill.

Welding Case Histories

The fifth in a series of publications which describe a variety of resistance welding case histories is now available. Both high standard aviation and commercial welding are included. For a copy of "Resistance Welding at Work," Volume 5, No. 6, write Dept. MPM, Sciaky Bros., Inc., 4915 W. 67th St., Chicago, Ill.

Conversion Factor Wall Chart

A conversion chart has been published for engineers, shop men and other executives. Designed as a convenient wall chart, it includes common conversions such as inches to centimeters or

watts to horsepower, as well as many conversions that are difficult to locate in reference manuals. For a free copy of the chart write Special Projects Editor, METAL PRODUCTS MANUFACTURING, York St. at Park Ave., Elmhurst, Ill.

AC Motor Catalog

A line of ac motors is described in a recently-issued catalog sheet. According to the manufacturer, the motors have oil capacities many times greater than conventional motors and a method of packing the oil wicking that assures equal oil distribution at all times. The two-pole shaded-pole motors are available in nine models. To obtain a copy of the catalog, write Dept. MPM, General Industries Co., Elyria, Ohio.

Forming Lubricant Bulletin

Draw Clean "M" lubricant, which is said to lower reject rates on drawing and forming steel, aluminum, copper and brass, is described in a technical bulletin. According to the manufacturer, pressures of 40,000 psi do not wipe the lubricant off metal, although it can be removed easily in a mild detergent solution. Miscible with both water and oil, the lubricant may be adapted to light stamping, deep drawing, cold heading, stretch forming, tube bending, tapping, spinning, punching, and wet grinding. For a copy of Bulletin F-10393, write Dept. MPM, Oakite Products, Inc., 26H Rector St., New York 6, N. Y.

Compressor Specification Sheet

A specification sheet describes a series of welded, hermetically-sealed compressors for air conditioners and heat pumps. The series includes 2½, 3, 3½ and 4-hp models, all featuring internal spring mounting for quiet operation, statically and dynamically balanced crankshaft, positive displacement gear oil pump, automatic reversing and heavy-duty motors. For a copy of Specification Sheet No. 5909, write Dept. MPM, Copeland Refrigeration Corp., Sidney, Ohio.

Finishing Systems Bulletin

Typical finishing systems and applications are shown in a recently-issued bulletin. Described are integrated systems of ducts, blowers, conveyors, and heating and control equipment. To obtain a copy, write Dept MPM, Michigan Oven Co., Finishing Equipment Dept., 423 Brainard, Detroit 1, Mich.

Lead in the Ceramic Industry

The advantages and applications of lead-bearing porcelain enamel are explained in a recently-published booklet. The booklet explains how lead lowers an enamel's melting point, and allows it to be fused onto aluminum at temperatures low enough so that the aluminum remains stable. Other properties of lead in enamel are also discussed. For a copy of the booklet, write Dept. MPM, Lead Industries Association, 60 E. 42nd St., New York 17, N. Y.

Direct-On Porcelain Enameling With Citric Acid Pickle

The use of a citric acid pickle bath is the key to successful direct-on porcelain enameling, according to technical information recently released. Advan-

to Column 3, next Page →

Speed forming pre-plated lawn mower handles

THE FORMING OF pre-plated lawn mower handles at the rate of 180 per hour is being accomplished by a newly-developed power bender. The Foley Mfg. Co., Minneapolis, Minn., uses this machine to cut costs by gaining production speed, and to free their hand benders for experimental work.

The handles are formed of ¾ to ⅞-inch steel tubing with an 18-gauge wall thickness. Bends with a centerline radius as small as two inches are made in the ¾-inch tubing. All tubing is purchased pre-plated. William Nettekoeven, Foley's methods engineer, says that pre-plating is feasible because gripping jaws of the bender do not damage finish.

The power bender can bend a ⅜ inch by 1 inch flat steel stock edgewise, or bend any equivalent in tubing, angle iron, channels, mouldings, extrusions, and solid bars of any shape. Standard radius capacities range to 24 inches, but can be increased.

An advantage gained from having the power benders in operation is that any bends developed by the hand benders in the model shop can be put into immediate production.

PHOTO COURTESY O'NEIL-IRWIN MFG. CO.

Operator completes second bend in lawn mower handle. The bends are formed in one continuous operation, allowing operator to produce 180 handles per hour.

New literature

→ *from preceding Page*

tages of this process are said to include doubling of oven capacity, reduction of handling time, and a better, more flexible porcelain coating. To obtain complete technical information on the process, write Dept. MPM, Chas. Pfizer & Co., Inc., Chemical Sales Div., 630 Flushing Ave., Brooklyn 6, N. Y.

Acid Gold Plating Process

A six-page paper describes metallurgical properties, operational data, and uses of a patented acid-type industrial gold electroplating formulation, which is trademarked Autronex. The paper covers in detail the composition of this low pH gold formulation for industrial applications. Deposit characteristics, corrosion resistance, equipment requirements, solution makeup and maintenance, gold consumption, trouble shooting, analytical procedures, and metal content are carefully outlined. Booklet AG-2 can be obtained by writing Dept. MPM, Sel-Rex Corp., Nutley, N. J.

Welding and Cutting Torches

A newly-revised catalog covers a line of gas welding and cutting hand torches, outfits, tips, and accessories. The revised edition contains information on many new products and improvements including the general-purpose welding torch with stainless steel head and fixed-flow valves; two series of hand cutting torches; four cutting attachments; Bernz-O-Matic kits for utility flame heating applications; natural gas heating and brazing tips; and a wide variety of cutting and washing tips. For a copy of the catalog, write Dept. MPM, Air Reduction Sales Co., 150 E. 42nd St., New York 17, N. Y., and ask for Form ADC 702E.

Idea File on Hardware

This manufacturer offers a new 1960 Idea File on appliance hardware. It describes the company's line and details the firm's experience in the design and production of appliance hardware. Write Amerock Corp., Industrial Sales, Dept. MP20, Rockford, Ill.

Screw Machine Products Handbook

A 104-page handbook designed to provide a thorough guide to estimating screw machine products for both independent producers and company-operated machine departments has been reprinted for additional distribution. Topics covered in the handbook include

Castings by ACME ALUMINUM FOUNDRY CO., Chicago

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ALUMINUM CLEANER NO. 19

Even the finest organic or ceramic coatings are not satisfactory unless the base metal is CHEMICALLY CLEAN. MACCO No. 19 is a brilliant, new, streamlined 1957 chemical development, *ideal for use in either spray type washer or tank.* This highly efficient cleaner will thoroughly CLEAN and BRIGHTEN aluminum and die cast metal WITHOUT ATTACK. *Just One Operation—No Smut—No Acid Dip.*

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basic quoting procedures and qualifications; materials; estimating production on various equipment; setup; operating; administrative and other costs; specific examples of estimating; and estimating forms and aids. To obtain a copy of "Estimating Manual for the Screw Machine Products Industry," write the National Screw Machine Products Association, Dept. MPM, 2860 E. 130th St., Cleveland 20, Ohio. The handbook is priced at $7.95.

Zirconium Fact File

A "Fact File" has been issued containing technical data, application information, and details on available forms of zirconium. The Fact File gives useful data and sources of supply of zirconium for executives, technical and research personnel engaged in chemical processing, electronics, automotive, aircraft, missiles, and other fields. For a copy of the Fact File, write on company letterhead to Dept. MPM, The Zirconium Association, 2130 Keith Building, Cleveland 15, Ohio.

Thermal Design Report

Technical Report 7-8-9 describes and analyzes thermal problems affecting electron tubes in modern electronic equipment. Applications of Thermion, a thermal analog tube, in quantitatively evaluating and experimentally alleviating these problems, are presented. For a copy of the report, write Dept. MPM, Research Council, Inc., 1062 Main St., Waltham 54, Mass.

Sub-Fractional Motor Catalog

This company offers a catalog on their complete line of sub-fractional hp electric motors. It outlines their manufacturing facilities and engineering know-how. For your copy, write Dept. MPM, SpeedWay Mfg. Co., Division of Thor Power Tool Co., LaGrange Park, Ill.

Unitized Tooling Manual

"Maintenance of Unitized Tooling," is a manual containing information for users of any type of punches and dies. It is written by Ray I. Smith, industrial engineering supervisor at the Butler Mfg. Co. Among the topics covered are greater punch and die life, proper punch length and die button height, stripping essentials, die setting procedures, inventory control of units and parts, and importance of punch retainers. The manual was written for Punch Products Corp., and may be obtained by writing that company at 3800 Highland Ave., Niagara Falls, N. Y.

Stainless Steel Gage Blocks

Literature describing the recently-announced stainless steel gage blocks is now available. According to the manufacturer, the gage blocks have greater hardness and resist nicking and burring four times better than ordinary steel blocks. To obtain the literature, write Dept. MPM, The DoALL Co., Des Plaines, Ill.

Timing Belt Drives Book

A recently-published book presents detailed information on the selection, design, installation, operation, and maintenance of timing belt drives. Typical uses that are described and illustrated range from electric typewriters to high torque applications in driving heavy industrial equipment. A copy of the book may be obtained by writing for Catalog No. DTE-1—"Dick Engineering Data for Stock 'Timing' Belt Drives." Dept. MPM P59, R. & J. Dick Co., Inc., Totowa, N. J.

Stepper Line Brochure

A 12-page booklet describes a new line of stepper motors and pulsed stepping devices. Complete information is given on motors, rotary stepping swit-

ches, pulse dividers, precision sequences, counters, interval timers and positioning devices. The booklet contains schematic drawings of application circuitry as well as pulse profiles. Copies may be obtained by writing Dept. MPM, The A. W. Haydon Co., 232 N. Elm St., Waterbury, Conn.

Joining Aluminum Parts

What are the best ways to mechanically join aluminum parts? This question and others about mechanical fastening methods for aluminum are answered in a technical handbook, "Mechanical Joining of Aluminum." The illustrated 32-page book covers nails and pins, metal stitching, mechanically-formed joints and architectural fasteners. The booklet is available on letterhead request from Dept. MPM, Reynolds Metals Co., Dept. PRD-28, Richmond 18, Va.

Custom-Molded Plastics

An eight-page brochure presents a value analysis approach to the design and purchase of plastic parts and components. Case histories of parts molded by the company give detailed purchasing and design analyses. A section on standard stock knobs that can be purchased from the company is also included. To receive the booklet, write on company letterhead to Dept. MPM, Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago 51, Ill.

Forty-five Page Handbook on Design with Honeycomb

A handbook on design with honeycomb offers a convenient summary of sandwich design methods complete with formulas and examples for stress computation on typical sandwich structures. Included are large sections on such aspects of honeycomb construction as sandwich theory impact, fatigue, creep, environment, selection of facings, selection of adhesives, selection of core material, surface preparation for bonding, tooling methods, quality control, and many other considerations vital to honeycomb design. To obtain the brochure, write Dept. MPM, Hexcel Products, Inc., 2332 Fourth St., Berkeley, Calif. Ask for Brochure E and enclose 50c to cover cost of handling and mailing.

Porcelain Enameling Aluminum

A 22-page guidebook on the application of porcelain enamel to aluminum contains several illustrations in full color and covers alloy selection, metal preparation, choice of frit, slip formulation, enamel application, and firing. In addition, the book compares the advantages of porcelain enameled aluminum to those of porcelain enameled steel. "Porcelain Enameling of Aluminum" is available on letterhead request from Dept. MPM-27, Reynolds Metals Co., Richmond 18, Va.

Motor Reducer Catalog

A new catalog describes a line of motor reducers for use with equipment such as blowers, compressors, conveyors, cranes, hoists, elevators, machine tools, rotary mills, mixers and stokers in such industries as metalworking, chemical and rubber. The catalog describes the construction and mechanical features of motor reducers in eight housing sizes for applications up to 125 hp and output speeds of 9 rpm to 420 rpm. To obtain a copy of Catalog MR-58, write Dept. MPM, Philadelphia Gear Corp., 3620 "G" St., Philadelphia 34, Pa.

Friction Clutch Press Line

A new line of Series AF inclinable presses, featuring an instant-engaging, low-inertia friction clutch and brake is introduced in a 24-page bulletin. A com-

plete description of standard and optional features, specifications, die space dimensions, strokes and shut heights are included. To obtain a copy of Bulletin 55, write Dept. MPM, Niagara Machine & Tool Works, Buffalo 11. N. Y.

Steel Blast Cleaning Abrasives

Important factors to be considered in the selection of steel blast cleaning abrasives are outlined in a new 20-page booklet. Non-technical in style, the illustrated booklet describes the latest metallurgical developments applied in the production of steel shot. Features which make one brand of abrasive better than another are graphically presented along with photographs showing how poor-quality shot can prove costly regardless of initial price. Copies of Booklet 2294 may be obtained by writing Dept. MPM, Pangborn Corp., Hagerstown, Md.

Automatic Spray Finishing

A special machine which adapts the chain-on-edge principle to automatic spray finishing is described in this literature. The machine is equipped to handle necessary spray guns for painting from above and beneath, with continuous or skip spray. Any number of workholders from a minimum of 15 can be supplied on centers to suit the size of the part and the loading and drying time. The machine is equipped with a variable speed drive on the conveyor and can be equipped with a variable-speed drive to rotate the part. For more information on the machine, write Conforming Matrix Corp., 434 Toledo Factories Building, Toledo 4, Ohio.

Industrial Metal Cleaners

A brochure describing a full range of industrial metal cleaners is now available. Included in the brochure is information on Cerfa-Kleen metal cleaners for hot power washers, cold power washers, hot soak tanks and cold soak tanks. For a copy of the brochure, write Dept. MPM, E. F. Houghton & Co., 303 W. Leigh Ave., Philadelphia 33, Pa.

Finishing Systems Bulletin

Production savings possible with automatic finishing systems are described in a new bulletin. Among the topics covered are material handling, washing, chromic acid treating, finish coatings, and drying and baking. To obtain Bulletin No. 51, write Dept. MPM, Despatch Oven Co., 619 E. 8th St., Minneapolis, Minn.

Circuit and Motor Protection

A motor and circuit protection catalog covers a line of protectors against motor burnout and dangerous circuit overload. Designated Mini-Breaker, the protectors can be factory set for any time lag desired. Ratings are available to suit every appliance. For a copy of the catalog, write Dept. MPM, Mechanical Products, Inc., 1824 River St., Jackson, Mich.

Roll Forming Bulletin

Roll forming techniques give greater design freedom, increase production and help eliminate purchasing headaches, according to a new bulletin. The bulletin explains how the company can produce sections in carbon, galvanized and stainless steel, aluminum, copper, zinc, and clad metals. To obtain Bulletin 1017, write Dept. MPM, Roll Formed Products Co., 3758 Oakwood Ave., Youngstown, Ohio.

Automated Finishing Systems

Detailed information and schematic drawings of automated finishing equipment are contained in literature now available. A detailed description of a vacuum metallizing line is one of the features described. To obtain a copy, write Dept. MPM, Metalwash Machinery Corp., 900 North Ave., Elizabeth 4, N. J.

Package Clutch and Brake

A bulletin describes a new concept in clutch and brake design for large mechanical presses. Called Torc-Pac 40, the unit, according to the manufacturer, is interchangeable on any of its presses in the 400 to 1200-ton capacity range; its sintered bronze friction linings permanently sealed-in-oil offer outstanding clutch and brake life and freedom from maintenance; and the unit's unique design, employing planetary gearing, is unusually compact. For full information on Torc-Pac 40, write Dept. MPM, Clearing Div., U. S. Industries, Inc., 6499 W. 65th St., Chicago 38, Ill.

Perforated Metals Catalog

A catalog listing the patterns available in perforated metal for functional or decorative use is available. Metallic materials the company can perforate include steel, aluminum, stainless steel, brass, copper, monel zinc, bronze, and others. To obtain General Catalog No. 75 and also a stock list of perforated steel sheets, write Dept. MPM, Harrington & King Perforating Co., Inc., 5640 Fillmore St., Chicago 44, Ill.

Porcelain Enamel System Developed for Magnesium

SPECIAL SURFACE PRE-TREATMENT is the key to a new porcelain enamel finishing system for magnesium developed by The Dow Metal Products Co., division of The Dow Chemical Co.

The pre-treatment makes possible the use on magnesium of standard lead-oxide or lithium-phosphate porcelain enamels already in use on other metals.

The finish is considered by Dow to be a virtually foolproof method of "painting out" the possibility of corrosion in magnesium alloys. Dow says it also offers the usual advantages associated with porcelain enameling, such as attractive coloration and texture, and excellent resistance to abrasion, scratching, and chemical attack.

According to Dow, porcelain-enameled panels of magnesium AZ31B alloy have withstood 500 hours of 20-per cent salt spray without corrosion. Panels with bared edges showed little edge corrosion. No "spall back" or undercutting because of corrosion at the edges was observed.

Panels exposed to exterior weathering in an industrial atmosphere showed no corrosion and no spall back from the bared edges after five months. When panels were heated to 800° F. and immediately quenched in cold water, no spalling because of cold shock resulted.

High-temperature engine parts, signs, building panels, cooking ware, and home appliances are listed as possible applications for porcelain-enameled magnesium.

The finishing system cannot be used with magnesium alloys of high aluminum content and of high total alloy content because these alloys contain low melting point eutectic. It has been used successfully, however, with the magnesium alloys of lower aluminum content, the magnesium-thorium alloys, and the magnesium-rare earth metal alloys.

EDITOR'S NOTE: Technical details on this new process will appear in MPM at a later date.

Drawing Compound Data

Dry-Film drawing compound is explained in a recently-issued data sheet. The compound is said to offer economy, excellent drawability, cleanability, complete solubility, and a wide choice of application methods. To obtain the data sheet, write Dept. MPM, L. R. Kerns Co., 2659 E. 95th St., Chicago 17, Ill.

INDUSTRY MEETINGS

ELECTRIC HOUSE HEATING

First National Electric House Heating Exposition, Sponsored by the Electric House Heating Equipment Section of the National Electrical Manufacturers' Association, Hotel Sherman, Chicago, March 21-23, 1960.

PRESSED METAL

Pressed Metal Institute's 1960 Spring Technical Meeting, Hotel Carter, Cleveland, Ohio, March 23-25, 1960.

GAS APPLIANCES

Gas Appliance Manufacturers Association's Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., March 30-April 1, 1960.

SCREW MACHINE PRODUCTS

National Screw Machine Products Association's 1960 National Business Meeting, Ambassador Hotel, Los Angeles, April 3-6, 1960.

ELECTRIC INSTITUTE

The 26th Annual Sales Conference of the Edison Electric Institute, Edgewater Beach Hotel, Chicago, April 4-6, 1960.

PACKAGING

American Management Association's 29th National Packaging Exposition, Convention Hall, Atlantic City, April 4-7, 1960.

WELDING

The American Welding Society's 41st Annual Convention and Welding Exposition, Los Angeles, Calif., April 25-29, 1960. (Technical Meetings, Biltmore Hotel, April 25-29; Welding Show, Great Western Exhibit Center, April 26-28).

HOME LAUNDRY

The American Home Laundry Manufacturers' Association's 1960 Convention, The Diplomat Hotel, Hollywood-By-The-Sea, Florida, April 27-29, 1960.

AIR CONDITIONING

The Air Conditioning Industries Association's Western Air Conditioning, Heating, Ventilating, and Refrigeration Exhibit and Conference, Shrine Exposition Hall, Los Angeles, Calif., April 27-30, 1960.

ARCHITECTURAL METAL

The 22nd Annual Convention of the National Association of Architectural Metal Manufacturers, Boca Raton Hotel and Club, Boca Raton, Fla., May 1-7, 1960.

CASTINGS

1960 Castings Congress and Exposition, Convention Hall, Philadelphia, May 9-13, 1960.

APPLIANCES

The 11th Annual Appliance Technical Conference. Sponsored by the American Institute of Electrical Engineers, Mansfield-Leland Hotel, Mansfield, Ohio, May 16-17, 1960.

APPLIANCE PARTS

The 21st Annual Convention of the Appliance Parts Jobbers Association, Inc., Dunes Hotel, Las Vegas, Nevada, May 17-21, 1960.

DESIGN ENGINEERING

Design Engineering Show, Coliseum, New York City, May 23-26, 1960.

NEW

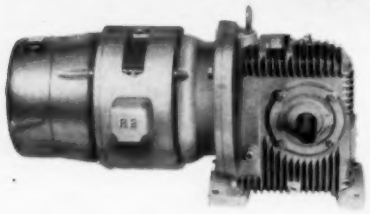
SUPPLIES & EQUIPMENT

Plastic Laminate

This new material, Kevinite, is described as a perfect laminate for OEM applications. It is described as a durable, stain-resistant, flexible, thermosetting, plastic laminate available in rolls or sheets. Standard patterns are available, or proprietary patterns can be developed for your exclusive use. It bonds to any sound surface and can be handled like a veneer. No special tools or equipment are required. For further information, write Dept. MPM, Swedlow, Inc., Youngstown 9, Ohio.

Worm Motoreducers

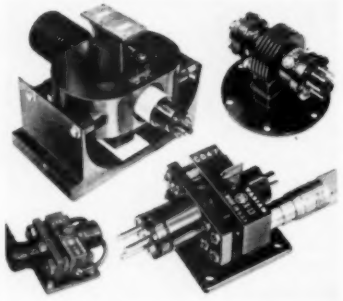
"Double-enveloping" worm motoreducers utilizing a new worm and gear mating principle gives full-depth contact of worm and gear teeth,



as well as increasing the number of teeth in mesh. This greater contact area reduces unit pressure and, as a result, lighter rated units can carry loads ordinarily requiring much larger and heavier housings. The units are rated from ½ through 15 hp.

For further information, contact Dept. MPM, Reuland Electric Co., Alhambra, Calif.

Decals for Difficult Applications



A new type of decal, Type "C", has been developed to mark special purpose vacuum tubes used in missiles, radar, and communications devices. After extensive tests, these decals were adopted because they achieved the traditional effect of printing or silk screen marking, while overcoming the usual short-comings of printing over curved areas, or when applied to inaccessible surfaces. The decals were particularly ideal because they provided an open-type letter.

For further information, contact Special Projects Editor, Metal Products Manufacturing, York St. at Park Ave., Elmhurst, Ill.

Type 2200 Thermolyne Hot Plates

A series of hot plates featuring a newly-designed thermostatic control unit that provides close, stepless control of temperature from 10° above ambient to 700° F. has been announced. Type 2200 Hot Plate consists of four models in two sizes, 12 inch by 12 inch, and 12 inch by 24 inch, each for either 115 or 230 volt operation.

The unit has a perforated control housing, heat reflecting baffles, air spaces, and ample insula-

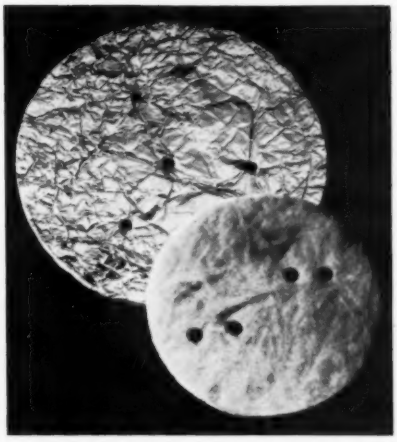
tion below the heating section aimed at focusing heat on the reacting thermostat, yet keeping the case and the rest of the interior cool for the protection of hands, table tops, and the other circuit components. Heavy gauge aluminum and perforated stainless steel are used in the case construction.

The plates are recommended for a wide range of laboratory and production applications requiring a precisely controlled and reliable heat source.

For further information, contact Thermo Electric Mfg. Co., 624 Huff St., Dubuque, Iowa.

Glass Fibre, Aluminum Foil Laminate

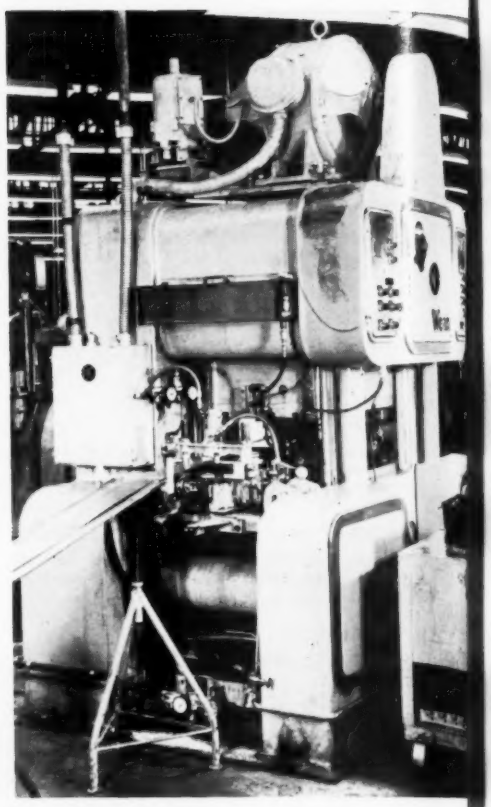
Glass Fibre fabricated with aluminum foil laminated on one side is now available. The material is light and can be used for insulation



of electronic equipment and appliances, and is approved for use in electrical fixtures by Underwriter's Laboratories.

The laminated glass fibre can be fabricated from one-inch square up to 32 inches by 54 inches. Complex shapes can be die-cut as well as having perforations of any size made within areas.

For further information, contact Illinois Fibre Specialty Co., 3608 S. Oakley Ave., Chicago, Ill.



Gearless Press

A "gearless" high-speed press, believed by the manufacturer to be the first metalworking press ever produced without any gears in the drive mechanism, has been introduced.

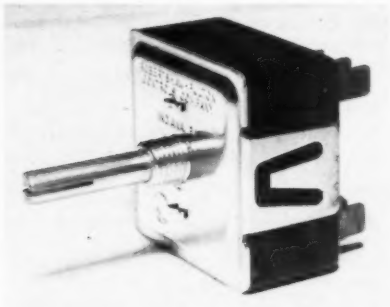
Originally designed to solve a specific production problem at a leading plant in Pennsylvania, the press enabled this plant to blank "E" and "I"-shaped .025-gauge silicon steel magnet and armature-core laminations at a rate of 450 strokes (or 900 pieces) a minute, fully twice the speed attainable with any previous method.

Three widely-separated crankshafts drive a rotating frame in which the upper die is mounted. The crankshafts are joined by solid connecting rods rather than by gears or chain linkage.

For further information, contact Special Projects Editor, Metal Products Manufacturing, York St. at Park Ave., Elmhurst, Ill.

Infinite Control

An infinite control for electric ranges and similar domestic and commercial applications is claimed to offer many features. The device is a



bimetal input regulator which controls a wide selection of inputs to the heating element. It is basically designed for 240 or 120 volt ac, but can also be furnished for other ac voltages. It will handle loads to 15 amperes.

For further information, contact Dept. MPM, Indiana Div., Robertshaw-Fulton Controls Co., Indiana, Pa.

NEW

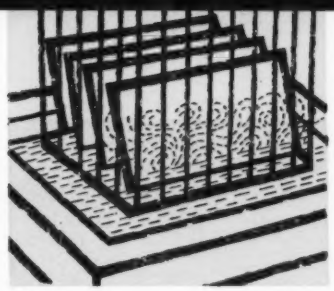
PRODUCT NEWS FROM Pfizer

NOW!

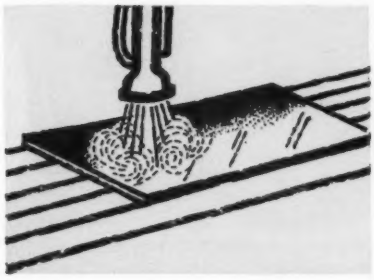
Manufacturing Chemi O

Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y. Chemical Sales Division, Branch Offices: Clifton, N. J.; Chicago, Ill.; San Francisco, Calif.; Ver Atla

1 **Pickle in citric bath**



2 **Apply cover coat frit directly.**



3 **Fire in existing equipment.**

PRACTICAL DIRECT-ON PORCELAIN ENAMELING WITH PFIZER CITRIC ACID

It's simple. The secret of really practical *direct-on* porcelain enameling is using a *citric acid* solution as your pickling bath. And *direct-on* porcelain enameling means you can double your oven capacity, cut your handling and obtain a better, more flexible porcelain coating. Bond and finish characteristics are excellent.

In this new Ray-Davis* process, only cover coat enamel is required. The ground coat step is completely eliminated. Although adequate process controls are needed, no special handling technique or major installation of equipment is required.

Mail in the coupon below for complete technical information on this important new porcelain enameling development.

Important advantages of the Ray-Davis Direct-On process

- No special handling of pickled steel is required.
- No major installation of special equipment necessary.
- Uses non-premium type steels.
- Easy to handle—citric is a dry, non-toxic, water soluble acid.
- Only one application of frit.
- Doubles oven capacity.

***Developed by W. G. Ray, Chas. Pfizer & Co. and Shipp C. Davis, Daco Corp.**

Chemi *Over 100 Years*

Pfizer

Science for the world's well-being

Calif.; Ver Atlanta, Ga.; Dallas, Tex.; Montreal, Can.

Mail this coupon to:

CHAS. PFIZER & CO., INC. CHEMICAL SALES DIVISION
630 Flushing Avenue, Brooklyn 6, N. Y.

Please send me: ☐ Technical Information
☐ Sample of steel porcelainized by Ray-Davis process

Name_____

Company_____

Address_____

City_____ State_____

Metals PREFINISHED with these coatings have been exposure-proved on more than 1,000,000 homes

CAN YOU FIND A SAFER, SURER WAY

TO CUT PRODUCTION COSTS?

Pre-coated metals can mean assured savings in many new applications—*if you are sure of coating performance.*

Sherwin-Williams SUPERCLAD and KEMCLAD Enamels offer this assurance. Exposure-proved on exterior and interior applications including more than 1,000,000 aluminum house-siding installations, for periods as long as 14 years, they provide complete records of field performance.

If you are not now pre-coating or using pre-coated metals, it will pay you to investigate the production savings this process may offer. And if you are using pre-coating or pre-coated materials, it will pay you to investigate the additional advantages that SUPERCLAD or KEMCLAD may offer. The Sherwin-Williams Company, General Industrial Division, Cleveland 1, Ohio.

SHERWIN-WILLIAMS / INDUSTRIAL FINISHES

Southern Stove Buys Spark Stove

Southern Steel & Stove Co. has purchased the inventory, tools, dies and machinery of Spark Stove Co., Oakland, Calif., for approximately $200,000.

A. R. Spreen, Southern Steel & Stove president, said that approximately 20,000 sq. ft. of manufacturing space has been added to Southern's main plant in Richmond, Va., for the production of Spark oil heaters. The Spark line will include new models and will be distributed nationally by Ashley Automatic Wood Stove Co., Columbia, S. C.

Ingersoll-Humphryes Plans Expansion

The Ingersoll-Humphreys Div. of the Borg-Warner Corp. has announced plans for a $2 million construction program that will double the present production capacity of vitreous china plumbing fixtures. The project involves a total of six new buildings to be erected adjoining the present pottery structures on the Division's property at Mansfield, Ohio. Completion of the project is scheduled for the latter part of 1961.

Westinghouse Net Income Up in 1959

Net income of the Westinghouse Electric Corp. in 1959 after taxes and including special income was equal to $4.86 a common share, compared with $4.25 a year ago.

The board of directors declared a dividend of 30 cents a share on the common stock, which was split two-for-one by stockholders at a special meeting.

Waste King Universal Tells Ad Plans

Waste King Universal estimates its advertising budget in 1960 will be over four times greater than 1959 expenditures. The budget will be used to promote the company's new line of portable and undercounter dishwashers, garbage disposers, gas, electronic, and electric built-in ovens and ranges, free-standing ranges, and indoor incinerators.

The first announcement of these products was timed to break during the Winter Furniture Market and National Association of Home Builders Shows in Chicago.

Trane Introduces New Heater Line

The Trane Co. is introducing a new line of gas-fired heating equipment available in three types: propeller and blower unit heaters and duct heaters.

According to the company, the heaters provide a quick, efficient source of heat for commercial establishments, factories, warehouses and other areas. Propeller and blower heating units come in 10 sizes, and duct heaters are available in six sizes.

Appliance Technical Conference May 16-17 at Mansfield, Ohio

The 11th Annual Appliance Conference sponsored by the committee on Domestic Appliances of the American Institute of Electrical Engineers will be held May 16-17, 1960 at the Mansfield-Leland Hotel, Mansfield, Ohio.

M. A. Fuller, staff engineer, Whirlpool Corp., points out that "Holding of such conferences is one of the ways the AIEE fulfills its objective of the advancement of the theory and practices of electrical engineering and of the Allied Arts and Sciences, and the maintenance of a high professional standing among its members. In the particular context of appliance engineering, heavy emphasis is placed upon the Allied Arts and Sciences, and the professional development of all interested engineers in the appliance industry."

R. E. Brooker, president of Whirlpool, will keynote the conference. Subject matter will range widely from the subject of electrical connections and contacts to the integration of motors into an appliance design; to the philosophy of reliability, quality, and service of appliances.

R. A. Risser, Ohio Brass Co., Mansfield, is chairman of registration committee.

IHEA Elects New Officers

W. E. Benninghoff was elected president of the Industrial Heating Equipment Association at its annual winter meeting recently in Philadelphia. Benninghoff is vice president and Tocco Div. general manager of The Ohio Crankshaft Co.

Other new officers are H. J. Pugsley, senior vice president of Swindell-Dressler Corp., vice president; Roy R. Snyder, treasurer of W. S. Rockwell Co., re-elected treasurer; C. J. Schmidt, executive vice president of J. O. Ross Engineering Div., Midland-Ross Corp., executive committee; and Robert E. Fleming was re-elected executive vice president of IHEA.

Steelmark Featured in Steel Merchandising Program

Relying heavily on a symbol adopted by the industry—the Steelmark—the American Iron and Steel Institute is launching an industry-wide program to merchandise steel and products made of steel at the consumer level.

Steelmark is a modern insignia suggesting the lightness, smartness and versatility of modern steel. Members of the institute and their customers are being encouraged to use the Steelmark on product tags and labels, consumer and trade advertising, catalogs and sales literature, exhibits and displays, point-of-sale display materials, stationery, product packaging, postage cancellation advertising, factory and office buildings, and signs, including those of trucks.

According to the Institute, the symbol is the outgrowth of a nation-wide study which revealed that, although

to Page 66 →

Benjamin F. Fairless, president of the American Iron and Steel Institute, and Norman W. Foy (right), chairman of its committee to promote the use of steel, discuss the Steelmark symbol adopted for industry-wide use. The Institute is coordinating a major program to merchandise steel and products made of steel at the consumer level.

make NORTHWEST products BETTER!

the invisible ingredients

Northwest Chemical quality is equal to any in the field. Their formulas are based on careful research and long experience. The steady growth of the company and the acceptance of their products is due to the invisible ingredients compounded in each shipment going into a customer's plant.

Those ingredients which give Northwest Chemical customers a superior product are the careful, individual attention given each customer's requirements, expert analysis of the job to be done plus the technical ability and experience to produce basic formulas to exactly the point of top efficiency in each case and by constant stand-by service, to keep them that way.

That is the reason Northwest Chemicals are specified by an ever increasing number of the country's top manufacturers.

Remember—the cost per finished article is the true cost of your cleaner. Northwest's stand-by service keeps the job right.

Licensed Manufacturers { **Alert Supply Co., Los Angeles, California**
Armalite Company, Ltd., Toronto, Canada

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

TINT-TANIUMS

an exclusive Chicago Vit Development

GIVE RCA WHIRLPOOL REFRIGERATORS

manufactured by Whirlpool Corporation

MORE SALES APPEAL

TINT-TANIUMS ARE EASILY APPLIED BY EITHER SPRAYING OR DIPPING (without streaking and without oxide separation) DEPENDING UPON THE REQUIREMENTS OF INDIVIDUAL PARTS INVOLVED.

The meat storage compartment (left center) is a light blue Tint-Tanium, and the twin vegetable crispers at the bottom are a dark blue Tint-Tanium. Model shown is the GA-1400, top-of-the-line gas refrigerator-freezer.

To capture its share of today's style-conscious, consumer market, Whirlpool Corporation has incorporated fresh sales appeal in its refrigerators in a number of ways. One of them is through the use of Tint-Taniums on vegetable crispers. These colored frits, made exclusively by Chicago Vit, provide a number of distinct production advantages foremost among them being unequalled color stability. They are handled as easily as white titanium frits, and completely eliminate the chance for human error that exists in systems where colors are added at the mill. Tint-Taniums also bring you a number of distinct economic advantages. So, if you plan to use colors in your new models, you'll find it profitable to choose Tint-Taniums. There's nothing else like them!

Chicago Vitreous

CORPORATION

A Division of The Eagle-Picher Company

1425 S. 55th Court, Cicero 50, Illinois

1918-1958 • 40 YEARS OF SERVICE TO THE PORCELAIN ENAMEL INDUSTRY

Industry news

→ *from Page 63*

steel is synonomous with quality in the minds of the public, people frequently do not recognize products as being made of steel.

In its simplest form the Steelmark symbol features three hypocycloids (four-pointed, starlike figures) within a circle which also embraces the word "Steel." Its design permits variations of the Steel insignia to identify special kinds of steel such as stainless, galvanized, etc.

Benjamin F. Fairless, president of the American Iron and Steel Institute, said, "The Steelmark is an important step in the steel industry's determination to maintain and build public preference for steel. It is a symbol for achieving a broad and continuous public impact, upon which the individual marketing activities of steel producers can be built. This step marks the first time that steel has been merchandised industry-wide at the consumer level."

Welding Show to be Held April 25-29

Thousands of engineers from all over the world are expected to attend the 41st Annual Convention and Welding Exposition of the American Welding Society. The convention will be held April 25-29 at the Biltmore Hotel, Los Angeles, and the exposition will be at the Great Western Exhibit Hall, Los Angeles, April 26-28.

GAES West Coast Meeting

Gas-fired absorption systems for the refrigeration industry was the subject of a talk by James Bivins of the Southern California Gas Co. at a recent West Coast meeting of the Gas Appliance Engineers Society.

GAES members heard results of an executive committee meeting held in December. The committee reported that GAES is contemplating a special meeting in June to coincide with the 1960 American Gas Association Technical Conference in Santa Monica, Calif. Installation of new GAES officers for 1960-61 would take place at this time.

The executive committee also announced the appointment of three committee chairmen: Richard Albert, Utility Appliance Corp., membership; Edward Mohr, Minneapolis-Honeywell Regulator Co., constitution and by-laws; and Walley Kennedy, C. Koch & Associates, awards. A nominations committee and its chairman are to be appointed at a later date.

Westinghouse Names Managers for New Dealer Development Program

Four regional merchandising managers have been appointed to head a new Westinghouse Electric Corp. dealer development program. The four veteran Westinghouse sales executives will be responsible for planning sales strategy and merchandising activities. They will also work with distributors and retailers to establish a two-way informational program.

The four men and the regions of their assigments are: Carl T. Ellis, eastern; H. L. Wilkins, southern; R. W. Eckman, central; and E. J. Riley, western.

In sales, the four managers will develop long-range merchandising plans for dealers in their respective regions. Their informational function is to develop better communications between retailers and the factory.

WILKINS

ECKMAN

ELLIS

RILEY

Whirlpool Appoints Four Engineers

Whirlpool Corp. has established four staff engineering positions and appointed the following men to the posts: Clifton A. Cobb, director of advance development engineering; Walter J. Roth, director of service and laboratories; Spencer J. Kohlmann, director of automatic and wringer washer engineering; and William F. Scott, director of dryer and combination washer-dryer engineering.

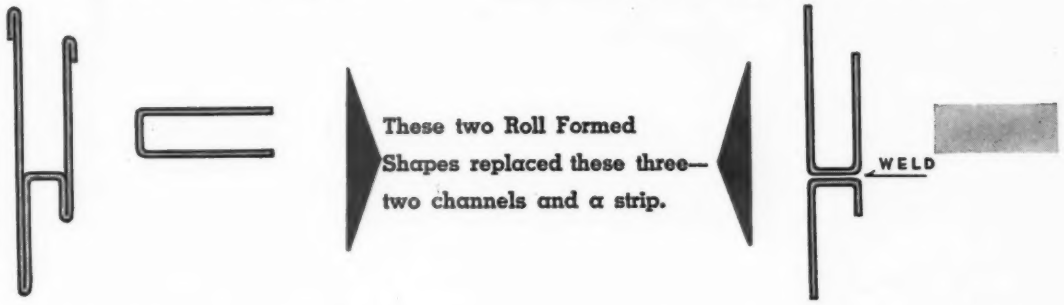
Cobb was manager of advance development at the time of his new appointment. Roth joined the Marion division of Whirlpool in February, 1957 as director of engineering. Previously, he had been chief engineer of the Beam Mfg. Co., Webster City, Iowa.

Kohlmann joined Whirlpool in January, 1957 as research laboratories project manager, and he was manager of automatic washer product engineering at the time of his latest appointment. Scott, before his recent promotion, was manager of combination

Landers Frary & Clark Entertain Distributors and Dealers

A reception and cocktail party for distributors and dealers was held by Landers Frary & Clark recently in the Drake Hotel, Chicago. On exhibit was the company's solid gold Coffeematic, which is valued at $50,000. The Coffeematic is set with nearly 500 diamonds and rubies. On hand to meet the distributors and dealers were (left to right) Stanley G. Fisher, vice president and general sales manager; Bret C. Neece, chairman of the board; H. S. Perkins, sales manager, LFC-Universal Electric Housewares Div.; Harry T. Silverman, president; Ralph Moore, sales manager, LFC-Universal Vacuum Bottle and Hardware Div.; and Frederick W. Richmond, chairman of the executive committee of the board of directors.

2 parts replace 3 and reduce assembly costs



IN DESIGN

Product design created production problems. Solid strip was difficult to obtain. It was replaced by a Roll Formed U channel which weighs 55 % less. Many cut hands resulted from old channels. Hemmed edges on special Roll Formed shape eliminated this hazard. Dimensions are identical and structural strength is improved. Over-all appearance is decidedly improved.

IN PRODUCTION

Old assembly required 10 welds — 6 on channels and 4 in assembly. Roll Formed shape requires just 4 tack welds in assembly. One supplier and just two components permit deliveries keyed to production needs. Hemmed edges on H shapes eliminated cut hands on assembly line.

IN PURCHASING

Bookkeeping reduced by elimination of one item. Deliveries on time and keyed to production needs. Total costs on purchased items and assembly time were drastically reduced. Shipping weight reduced and net profit on the completed item was increased.

METALS AND TECHNIQUES

Your sections can be produced in: carbon, galvanized and stainless steel; aluminum, copper, zinc and clad metals. Tubing, shapes, channels and angles can be punched, notched, pierced, cut to length and delivered burr-free to match your production schedule.

CAN ROLL FORMED HELP YOU?

Probably yes. The Roll Formed man can tell you. He'll go over your prints . . . work out an applicable section . . . plan deliveries with you. Meanwhile, you'll want Roll Formed Bulletin 1017. It shows how Roll Formed techniques give greater design freedom, increase production and help eliminate purchasing headaches. Get Bulletin 1017 today.

ROLL FORMED PRODUCTS COMPANY

MAIN OFFICE AND PLANT · 3758 OAKWOOD AVE. · YOUNGSTOWN, OHIO

washer-dryer engineering. He was project engineer for advance development at Maytag before joining Whirlpool in October, 1956.

Metal Stamping Firm To Build New Plant

Walter Poranski, president of Poray, Inc., metal stamping and finishing firm, has announced an expansion program which will include a new plant at 2101 Rice St., Chicago. The firm now operates two plants, one at 3369 Grand Ave., and another at 3403 Grand Ave., with a total of 300,000 sq. ft. of manufacturing space.

Armco Develops Base Metal for Direct-on Porcelain Enameling

Commercial production of a new base metal for direct application of porcelain has been announced by Armco Steel Corp. More than 15 years of research went into Univit, the special sheet metal.

According to the company, this new enameling iron puts an end to troublesome enamel fishscaling and boiling and promises substantial savings to the porcelain enamelers who have demonstrated that excellent enamel coating adherence can be obtained. Armco anticipates that

to Page 70 →

Expect 3,000 Persons at First Electric House Heating Exposition

The first National Electric House Heating Exposition, Chicago, March 21-23, is expected to draw more than 3,000 persons. The exposition is sponsored by the Electric House Heating Equipment Section of the National Electrical Manufacturers Association and is scheduled to be held in the Hotel Sherman.

A symposium will be conducted in connection with the exposition. Included on the three-day program are leading manufacturers, power suppliers, electrical contractors, bankers, architects, and builders.

Members of the planning committee for the first National Electric House Heating Exposition met at NEMA *headquarters to draft final plans for the program. From left to right are R. D. Smith, secretary of the* NEMA *Electric House Heating Section, sponsor of the show; C. F. Kreiser, section chairman and general sales manager, Electric Heating Division, Cavalier Corp.; Stanley B. Aronson, general chairman of the program and sales manager, Berko Electric Mfg. Corp.; Paul D. Hawkins, Electromode Div., Commercial Controls Corp.; and Roger A. Weiler, general manager, Sun-Tron Corp. Committee members not pictured are R. D. Graham, General Electric Co., and K. M. Spurrier, central area sales manager, Hunter Div., Robbins & Meyers, Inc.*

In Pemco's continuing search for better ceramic finishes, the answers start in the minds of men. The seed of an idea, often planted during casual reflection, is fed by the experience of 50 years and brought to fruition under practical laboratory and field testing procedures. At Pemco, the pattern is progress . . . **always** worth thinking about.

50 YEARS OF RESEARCH AND A FLAME

PEMCO

BALTIMORE 24, MARYLAND

HIGH QUALITY PORCELAIN ENAMEL FRITS AND COLORING OXIDES

Univit, which reportedly makes possible the successful application of a single finish coat in white or color directly on a fabricated metal part, will have its widest application in the major appliance industry.

Armco has indicated that licenses to manufacture this new product will be available to other producers.

Market Dates Announced

The board of governors of the American Furniture Mart have announced that the summer market will be held June 20-25, departing from the traditional 10-day summer market.

The 1961 winter market was set for January 6-14. This will be a nine-day market, a change from the usual two-week show. This change was made as a result of a request made by the National Retail Furniture Association.

Rieke Builds Office and Warehouse

Rieke Metal Products Corp. will build a one-story regional office and warehouse building in Linden, N. J. The project is the initial eastern warehouse operation for Rieke. New manufacturing plants were erected by the company in recent years near Toronto, Ontario and in Mexico City.

Chas. Pfizer & Co. Honors 38 Long-Service Employees

Thirty-eight employees who completed 25 years of service with Chas. Pfizer & Co., Inc., in 1959 were honored recently at a dinner given by the company's board of directors. The employees received engraved gold watches and service pins. Thirty-five of the 38 honored at the dinner are shown in the picture.

Ferro Reports Record Sales

Sales and earnings figures (unaudited) of Ferro Corp. for 1959 show the company had the best year in its history. Consolidated net income for the 40-year-old company was $3,331,000, up 68 per cent from the 1958 figure. Consolidated sales were $63,846,000, an increase of 13 per cent over the preceding year. Net earnings per share were $4.45.

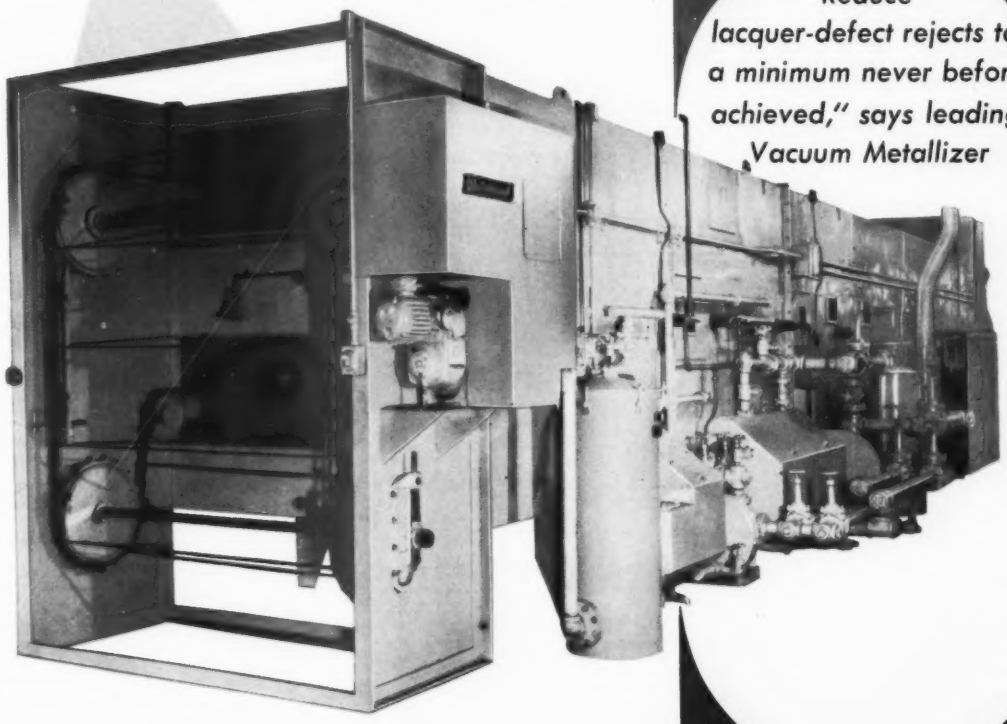
Commenting on the company's prospects for 1960, Chairman Robert A. Weaver said the company plans to expand foreign operations. The board of

FOR THE BEST IN **VACUUM METALLIZING**

Metalwash® Automated Finishing Systems

For Absolute Cleanliness and
For Perfect Lacquer Base Coatings

"Reduce lacquer-defect rejects to a minimum never before achieved," says leading Vacuum Metallizer



The Metalwash Automated Finishing System is unsurpassed in the Vacuum Metallizing industry.

Perfected by Metalwash engineers in close co-operation with METAPLAST PROCESS, Inc., Woodside, L. I., N.Y., one of the foremost Vacuum Metallizers, it

- Removes all dust, lint and de-greasing residue from the product.
- Provides 100% ten-micron filtration of solvents and lacquer.
- Flow-coats a perfect lacquer base coat, free of bubbles or runs.
- Polymerizes lacquer base coat at safe, controlled temperatures.
- Delivers the cooled product back to the loading station, ready for metallizing.

This Automated Finishing System for Vacuum Metallizing preparation is an example of what METALWASH engineering experience and skill can do for you.

FAST / Delivers one rack of work per minute.

ECONOMICAL / Only two men needed to operate.

SAFE / Approved by safety boards.

COMPACT / Integrates all pre-metallizing operations into one unit.

Write today for free detailed information and schematic drawings of this and other new METALWASH systems which have proved their superiority in solving industrial parts processing problems.

Metalwash® Machinery Corporation

ESTABLISHED 1926
900 NORTH AVE. ELIZABETH 4, N. J.

directors recently appropriated $800,000 for the construction of a new facility in Rotterdam, Holland. The present Ferro plant in Rotterdam serves 25 countries. Also, the company recently opened offices in London in addition to their plant in Wolverhampton, England.

Ferro maintains 12 plants in the United States and 13 subsidiaries and affiliates abroad.

Grieve-Hendry Moves to New Plant

Grieve-Hendry Co., Inc., industrial and laboratory oven and furnace manufacturers, have moved to new sales and production quarters at 1350 N. Elston Ave., Chicago. The manufacturer says increased production space allows the fabrication of virtually any type of heat processing equipment required.

AHLMA to Sponsor Home Laundry Appliance Technical Seminar

On March 24, American Home Laundry Manufacturers' Association Engineering and Research Committee will sponsor a home laundry appliance technical seminar at the Sheraton Towers Hotel in Chicago. This will be the first seminar of this type for the home laundry appliance industry.

The committee has established this technical meeting as a basis for exchange of information between home laundry engineers throughout the industry. While the program carries somewhat the same pattern as the National Appliance Technical Conference, it will be far more specific on the home laundry appliance problems.

A section on quality characteristics will discuss an industry survey on failure statistics and offer suggestions for reducing these failures. There will be a review of the ratio of failures as the number of parts in a specific appliance increases, and a report on cost and reliability comparisons. Methods of scientific measurement will come in for discussion, including measurement of wear, water extraction, etc. Laundry aids and dispensers will be surveyed, along with present developments and future possibilities in this area.

The meeting is open to AHLMA members, suppliers, designers, engineers, and others interested in the many aspects of home laundry appliance engineering.

Keynote speaker for the meeting will be Elisha Gray II, Whirlpool Corporation chairman of the board, who will appear during the luncheon.

AHLMA TECHNICAL CONFERENCE PROGRAM

Chairman: D. W. Lynch, General Electric Co., manager, engineering — home laundry department.

Reliability: *Quality Characteristics of Home Laundry Equipment,* Lon Israel, Whirlpool Corporation, product service manager; *Some Theoretical Aspects of Reliability,* Dick Clapp, Philco Corp., operations research.

Measurements: *Measurement Problems in Home Laundry Equipment Design,* E. O. Morton, Westinghouse Electric Corp., manager, laundry engineering dept.; *Subjective Evaluation,* R. H. Gabriel, General Electric Co., engineering manager, engineering test, home laundry dept.

Plastics — a Problem to Application Engineering: George Conlee, Speed Queen manager, engineering, Moderator; *Resin Formulator,* Franklin D. Dexter, Union Carbide Plastics Co., assistant director of development; *Fabricator,* Owen Skelton, Modern Plastics Co., general manager; *Underwriters' Laboratories,* William Farrell, Underwriters' Laboratories; *Design Research,* Carel Abresch, Hotpoint, engineering manager, washer engineering.

Laundry Aids — How Many and How Dispensed; Albert Emmanuel II, Philco Corp., product manager, home laundry equipment.

Discussion: James Alaback, Whirlpool Corp., director of engineering.

Foreign Competition—A Status Report: Nelson J. Smith, General Motors Corp., manager, overseas operations.

Interpreting Trends — Fabrics for the Appliance Manufacturer: P. J. Flynn, J. C. Penney Co., Inc., director, research laboratory.

Designing—Tomorrow's Home Laundry Needs: Speaker to be announced.

Discussion: George Allen, Norge Corp., manager, engineering.

Refrigeration Specialist

MPM PHOTO

This exclusive MPM photo shows R. E. Deaux, Chief Engineer for Advance Development, Product Engineering Dept., Evansville Div., Whirlpool Corp., Evansville, Ind., in his office at the Whirlpool Evansville plant.

MPM editors worked with Mr. Deaux in 1957 when he was Chief Engineer, Home Appliances, at Servel in Evansville. The resulting feature. "Engineering details of the Servel automatic ice maker," appeared in the August, 1957 issue.

Mr. Deaux was again most cooperative and helpful with the feature in this issue titled "The all new Whirlpool gas refrigerator," (see Page 24).

This photo shows him holding a section of one of the components of the new Whirlpool gas refrigerator.

Cribben & Sexton Honors Wendell C. Davis

Wendell C. Davis, president of Cribben & Sexton Co., has received a service pin for his 17 years with the company. Davis is one of several executives recently honored for long-term service with either Cribben & Sexton or Waste King Corp., parent firm of Cribben & Sexton.

Davis joined Cribben & Sexton in 1942 as controller, and was named treasurer in 1943, director in 1944, vice president in 1945 and president in 1948.

Predict 8 Per Cent Increase for Home Laundry in Canada

Factory sales of home laundry appliances in Canada during 1960 are expected to exceed 1959 by eight per cent, with a total volume of 498,000 units, according to the Canadian Home Laundry Manufacturers Associaton. Sales in 1959, the best year for the industry, totaled 454,771 units, an increase of 13 per cent over 1958.

The association bases the 1960 forecast on the following factors: important technical developments in washers, dryers and washable fabrics; increased family formations; emphasis on suburban living and "convenience" appliances, and the increasing marketing potential for replacement sales in the face of almost complete saturation of laundry appliances; record personal incomes; and the general continued trend toward improved living standards.

EEI Conference Set for April 4-6

The 26th annual sales conference of the Edison Electric Institute is expected to draw more than 1,000 sales executives of the electric power industry. The conference will be held April 4-6 at the Edgewater Beach Hotel, Chicago.

PMI Spring Technical Meeting

The Pressed Metal Institute's 1960 Spring Technical Meeting will be held March 23-25 at the Hotel Carter, Cleveland, Ohio. Among the topics on the agenda will be safety programs, increas-

to Page 80 →

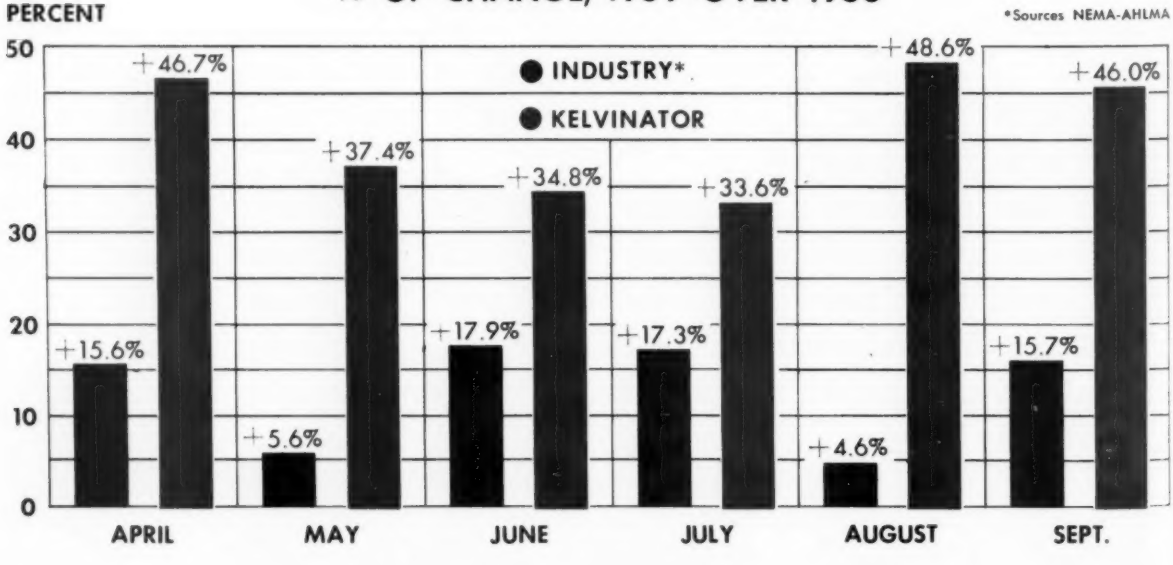
Kelvinator 1960

BEHIND THE ENVELOPING SCREEN OF PUBLICITY that has accompanied the remarkable growth of American Motors Corporation, there is *a great appliance story.*

KELVINATOR DIVISION OF AMERICAN MOTORS has been organizing, engineering, building *and* selling—selling to the tune of a 35 per cent increase for 1959.

THE COMPLETE KELVINATOR STORY, from Lord Kelvin to Fooderama '60, will be presented for the first time in a complete Special Section of May MPM—the eighth such Special Section in over sixteen years of publication.

APPLIANCE BILLINGS TO DEALERS
% OF CHANGE, 1959 OVER 1958



INDUSTRY PERSONALS

Paul V. Dugan is the new representative in the southwest Ohio area for **Northwest Chemical Co.** He will work in the area with Richard Jager.

Ward L. Heath has been named purchasing agent for the Grand Rapids plant of **Kelvinator Division, American Motors Corp.** Heath succeeds **Ray A. Van Stee,** who has been made director of product quality. **Heath** has been with Kelvinator for 23 years except for two periods of duty in the Army.

The company also announced the election of **Douglas A. McGregor** to the new position of comptroller for **Kelvinator International Corp.** In his new position, McGregor will coordinate the accounting activities of foreign licensees and subsidiaries including **Kelvinator, Ltd.,** of England, and **Kelvinator of Canada, Ltd.**

Alice M. Watters is a new member of the staff of the **Westinghouse Home Economics Institute.** In her new position as home economist, Miss Watters will work on product design and development with the engineering department as well as on product testing. For the past three years she has been associated with the American Home Economics Association and the Home Economics in Business.

MISS WATTERS

HEATH

John P. Bank has been appointed national service manager of **Thor Power Tool Co.** Bank, a field sales engineer and former works manager of the company's main plant in Aurora, Ill., will be in charge of expansion and improvement of Thor service and repair operations in the company's 23 branches in the United States and Canada.

Raymond V. Hahn, Jr. has been named president of the **Maytag West Coast Co.** and **James W. Jensen** has been elected treasurer. Distributor of Maytag appliances in California and western Nevada, the Maytag West Coast Co. is a subsidiary of **The Maytag Co.**

Thomas H. Truslow has been named merchandising consultant for Prizer Ware cast iron-porcelainized cookware, a product of the foundry division of **Textile Machine Works,** Reading, Pa.

Richard R. Heddleston has re-joined **The Patterson Foundry and Machine Co.** as sales manager. Heddleston had been a sales executive for Patterson for more than 20 years at the time of his departure in 1953. Since then he has been active with other processing firms serving the chemical and related processing industries.

T. Kenneth McGuire has been named a vice president of **The Devilbiss Co.** He will continue to direct the activities of a subsidiary company, **DeVilbiss Metal Fabricators Co.,** where he was vice president and general manager.

HEDDLESTON

MC GUIRE

General Electric has made three sales appointments in the company's television receiver department. **H. W. Bracken** is a regional merchandising manager with a new regional sales office in Atlanta, Ga. **Jack L. Hunter,** also a regional merchandising manager, will work with General Electric distributors in Syracuse, Utica, Albany, Buffalo, Pittsburgh, and Williamsport, Pa. The third new regional merchandising manager is **W. S. Lowry,** who will establish a new regional sales office in San Francisco.

C. Fred Kober has been named an authorized sales representative in Michigan for **National Electric Welding Machines Co.** Kober was formerly associated with National in its engineering, experimental, and testing departments. More recently he has been active in Michigan as an industrial sales and application engineer.

Mrs. Margaret Gregory has been appointed to the newly-created position of director of home services of **Locke Stove Co.** Mrs. Gregory has had 11 years experience in the appliance field, working principally with manufacturers and distributors in the Detroit area.

Dr. Choh-Yi Ang has been appointed director of the materials laboratories of **P. R. Mallory & Co., Inc.** Dr. Ang will direct research and development of new structural and electronic materials and processes, heat resistant and semiconducting intermetallics, and neutron and gamma radiation.

STENTZ

DR. ANG

A. C. Stentz has been promoted to the position of factory manager of the heating and air conditioning factory of **Lennox Industries, Inc.** During his 15 years with Lennox, Stentz has been production superintendent and assistant factory manager.

Norman E. Johnson has been promoted from vice president to president of **Admiral International Corp.** and **Admiral Corp. Interamericana.** Johnson joined Admiral's legal staff in 1952 and was appointed associate general counsel three years later. He became vice president of foreign operations in 1956.

R. L. Smith has been appointed to the newly-created position of statistical and training coordinator for the **Ditzler Color Division** of **Pittsburgh Plate Glass Co.** Smith had served as regional sales manager in the central states for the past five years. He joined the Ditzler organization in 1934.

Robert W. Taylor has been transferred to Kansas City as the technical sales representative for the **Metalworking Chemicals Division** of **Amchem Products, Inc.** His new territory will include Missouri, Kansas, Colorado, and Nebraska.

Copeland Refrigeration Corp. has added three new regional managers and reassigned field sales responsibilities.

The new regional managers joining Copeland are **A. S. Garven,** in charge of sales in the New England states, northern New Jersey, and metropolitan New York City; **Dennis J. Miller,** responsible for Nebraska, Iowa, southern Wisconsin, northern Illinois, and northwestern Indiana; and Associate Man-

ager **E. L. Johnson,** who with Regional Manager **F. E. Jernberg** will be in charge of sales in the Pacific Northwest and northern midwest states.

Several transfers among present Copeland personnel have been completed. **Dale H. Bodine,** formerly manager of educational services, has been appointed manager of the Ohio, Kentucky, central and south Indiana, western West Virginia, and western Pennsylvania region.

George V. Mercer has been named manager of the Kansas City field engineering office of **Lord Mfg. Co.** He has been with Lord for the past six years, most recently as a field engineer in the Chicago area.

O. H. Krug has been appointed national sales manager of **Cole Steel Equipment Co., Inc.,** manufacturers of office equipment and furniture. He has been associated with Cole for 10 years.

Chester Magaro has been named a technical specialist for **Kaiser Aluminum & Chemical Sales, Inc.,** it was announced by J. R. Young, manager of technical services for **Kaiser Aluminum.** In his new position, Magaro will assist customers in aluminum finishing projects. He will serve on Kaiser Aluminum's Technical Services staff located in Chicago.

KRUG

MAGARO

Kenneth S. Franklin has been named field service manager of **Hussmann Refrigerator Co.** He is directly responsible for the training and selection of field service engineers and will report to R. A. Line, manager of marketing services.

The company also named **Arthur McCombs** manager of factory warranty and parts service. He will handle all shipments of parts, preparation of final installation instructions, and the preparation of service bulletins, and will report to W. A. Vormehr, vice president of manufacturing.

Hussmann also announced the retirement of **John H. Spence,** service manager. Spence first joined the organization in 1937. He has been service manager since 1945.

Howard B. Gordon has been appointed purchasing agent of **Eaton Mfg. Co.'s Stamping Division.** The company also announced that **John D. Newton** has joined the division as sales representative with headquarters in the Detroit Sales Office.

J. R. Johnson has been elected president of **Royal Industries, Inc.,** manufacturers of electronic equipment. Johnson, who previously had been executive vice president, succeeds **M. L. Bengtson,** who resigned for reasons of health. Johnson joined Royal last year after serving as executive vice president of Standard Coil Products for three years.

GORDON

JOHNSON

Russell W. Kenyon has been appointed vice president in charge of sales of the **L. R. Kerns Co.** Kenyon has been associated with Kerns for 16 years, serving as eastern regional sales manager for the last six years, and manager of the Detroit office prior to that time.

T. B. Focke has been appointed vice president of the **Plumbing-Heating-Air Conditioning Group** of **Crane Co.** Focke was president and a director of National-U. S. Radiator Corp., which Crane acquired February 1.

Tommy R. Brock has been promoted to sales manager of **Temco, Inc.,** F. Donald Hart, president of Temco, announced at the firm's national sales meeting recently. At the same time, Hart announced the promotion of **Kendrick Shinnick** from sales department to assistant sales manager.

National Can Corp. announces that **John W. Haslett** has joined the company as manager of production planning for the central division. He will headquarter at the Chicago general offices.

Robert Marks, 13-year veteran in all phases of the vending industry, has been appointed Eastern sales and service engineer for **A.B.T. Division of Atwood Vacuum Machine Co.,** Rockford, Ill. He will provide A.B.T. eastern customers with direct-to-factory representation for the firm's line of vending machine and currency-handling components.

H. H. Schreiber has been named vice president in charge of sales for **Poray, Inc.,** a Chicago firm specializing in appliance, television and automotive stampings, trim, and finishing. Schreiber joined Poray in 1948 as purchasing agent, and more recently has been sales manager of the firm.

SCHREIBER

BUCHANAN

Royal S. Buchanan has been named to the new position of assistant director of appliance engineering and research for the **Kelvinator Division, American Motors Corp.** He was previously manager of the advanced engineering section of the refrigerator-freezer engineering department for Westinghouse.

Dr. George C. Harrison, Jr. recently joined **Amchem Products, Inc.,** Ambler, Pa. He was until recently engaged in the study of complex organic and inorganic compounds at Pennsalt's Whitemarsh Research Laboratories. At Amchem, he is specializing in protective coatings for steel in the Metalworking Chemicals Division.

Fred H. O'Kelley, Jr. has been appointed marketing manager for **Raytheon Co.'s Commercial Apparatus and Systems Division,** it has been announced. He will be responsible for the division's marketing research and administration, sales, advertising production, product planning, and applications engineering.

Ralph Wenzel, a Maytag dealer in Liberty, Mo. for 13 years, has joined **The Maytag Co.** on special assignment to the marketing vice president of the laundry appliance firm.

William M. Krupp has been promoted to manager of accounting at **Mueller Climatrol.** H. P. Mueller, Jr., executive vice president, announced that Krupp will be responsible for the accounting control and financial functions of the Mueller Climatrol Division.

Louis G. Shenk, Jr. has been appointed manager of heating and cooling product lines of the **Plumbing and Heating Division** of **American-Standard.** He joined the firm in 1949 as a sales trainee.

Fabricating the Hotpoint

→ *from Page 44*

Station 6 — (Idle).

Station 7 or 8 — (Depending on model) Pierce holes in return flange at top of door. (All side holes in return flanges are handled on the No. 2 press).

Station 9 — (Idle).

After the transfer to the second section of the line, the same operations are duplicated on the opposite end of the door, plus an operation for piercing the scuff plate holes in the bottom of the door return flange and welding a door plate (on some models). Drain holes are pierced in all models.

The door line is equipped with dual piercing heads which provide for a change from right-hand doors to left-hand doors by simply pushing a button which immediately changes the head selection.

Liner fabrication

Unlike the outer cabinet and door lines, few changes were required in the plant setup at Hotpoint to handle fabrication of liners for the new models. The two automatic seam welders used for completing fabrication of the liners are equipped with universal fixtures, designed to take care of the liner requirements for all models. Two complete units are available so that production need never be interrupted on the seam welding line and, with the universal fixtures, there is a minimum requirement for changeover time.

The sequence on the liner fabrication is as follows: (1) flat sheet feeds into a 400-ton single-action blanking press; (2) blanked sheet feeds to a 400-ton press for flange forming (this press is automatically unloaded into a turnover which is part of a transfer machine); (3) flanged sheet feeds into a "return flange machine" for forming side flanges and return flanges; (4) this station is a U-folder, which completes the fabrication operations prior to welding; (5) a two-stage washer located between the U-folder and the seam welders; (6) seam welding on one of the two units described earlier.

EDITORIAL NOTE: Particularly helpful in developing this feature were the following men in the Hotpoint Refrigeration Department: Marshall Payne, manager of manufacturing; Nicholas A. Massello, manager of manufacturing engineering; R. De Amicis, supervisor of process engineering; and Robert Smith, senior process engineer.

METAL PRODUCTS STATISTICS

		1959 (Units)	1958 (Units)	% Change
Gas-Fired Furnaces	December	58,300	65,600	−11.1
	Jan.-Dec.	1,046,700	853,700	+22.6
Gas-Fired Boilers	December	6,400	7,300	−12.3
	Jan.-Dec.	136,200	123,200	+10.6
Gas Conversion Burners	December	7,900	6,800	+16.2
	Jan.-Dec.	156,300	142,000	+10.1
Oil-Fired Central Heating Equipment	November	62,031	51,264	+21.0
	Jan.-Nov.	587,533	523,740	+12.2
Gas Ranges, Free-Standing	December	116,200	156,500	−25.8
	Jan.-Dec.	1,661,800	1,665,000	− 0.2
Gas Ranges, Built-In	December	31,800	24,500	+29.8
	Jan.-Dec.	355,100	231,500	+53.4
Gas Water Heaters	December	195,400	207,300	− 5.7
	Jan.-Dec.	2,957,200	2,673,400	+10.6
Gas Vented Recessed Wall Heaters	December	36,000	35,200	+ 2.3
	Jan.-Dec.	448,900	389,000	+15.4
Gas Floor Furnaces	December	2,600	5,300	−50.9
	Jan.-Dec.	97,000	97,500	− 0.5
Gas Direct Heating Eqpt.	December	61,300	90,400	−32.2
	Jan.-Dec.	1,463,100	1,395,900	+ 4.8
Gas Unit Heaters & Duct Furnaces	December	16,200	14,500	+11.7
	Jan.-Dec.	160,600	133,800	+20.0
Gas Incinerators	December	2,600	6,500	−60.0
	Jan.-Dec.	44,300	51,800	−14.5
Electric Household Refrigerators	December	282,600	286,900	− 1.5
	Jan.-Dec.	3,785,000	3,116,700	+21.4
Electric Farm & Home Freezers	December	63,200	65,600	− 3.7
	Jan.-Dec.	1,205,400	1,100,900	+ 9.5
Electric Ranges, Free-Standing	December	79,800	84,300	− 5.3
	Jan.-Dec.	933,800	810,100	+15.3
Electric Ranges, Built-In	December	67,700	59,700	+13.4
	Jan.-Dec.	753,000	544,400	+38.8
Electric Water Heaters	December	41,300	68,600	−39.8
	Jan.-Dec.	757,600	832,500	− 8.0
Electric Dishwashers	December	69,000	55,500	+24.3
	Jan.-Dec.	579,600	424,700	+36.5
Electric Food Waste Disposers	December	75,100	67,800	+10.8
	Jan.-Dec.	774,400	616,500	+25.6
Combination Washer-Dryers	December	14,341	21,662	−34.0
	Jan.-Dec.	196,175	168,375	+17.0
Washers—Automatic & Semi.	December	215,338	268,049	−20.0
	Jan.-Dec.	2,934,073	2,781,038	+ 6.0
Washers—Wringer & All Other	December	48,898	62,471	−22.0
	Jan.-Dec.	899,303	891,311	+ 1.0
Electric Dryers	December	86,529	100,726	−14.0
	Jan.-Dec.	905,192	823,522	+10.0
Gas Dryers	December	48,104	47,944	+ 0.3
	Jan.-Dec.	476,583	378,676	+26.0
Vacuum Cleaners	December	293,818	316,965	− 7.3
	Jan.-Dec.	3,420,830	3,295,047	+ 3.8
Metal Furniture	December	*	*	*
	Jan.-Dec.	*	*	+ 5.0
†Television	December	593,170	414,850	+42.9
	Jan.-Dec.	6,349,380	4,920,428	+29.0
†Radio (1)	December	1,553,308	1,525,744	+ 1.8
	Jan.-Dec.	15,622,357	12,577,243	+24.2
Compressor Bodies (2)	June	497,692	333,642	+49.1
	Jan.-June	3,080,560	2,139,885	+44.0
Steel Barrels & Drums	November	2,267,407	2,405,606	− 5.6
	Jan.-Nov.	30,433,118	28,840,197	+ 5.5
Steel Pails	November	5,370,968	4,971,798	+ 8.0
	Jan.-Nov.	74,334,631	67,080,146	+10.8
Typewriters	December	140,223	*	*
	Jan.-Dec.	1,281,674	*	*
Unitary Air Conditioners (3)	Jan.-Sept.	234,444	*	+47.0
Heat Pumps	Jan.-Sept.	25,834	*	+108.0

(1) Including auto receivers (2) Except for household refrigerators
(3) Including heat pumps * Not reported
† Output — all other figures are factory shipments or factory sales

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, Air-Conditioning and Refrigeration Institute, and U.S. Dept. of Commerce.

safe transit

editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

"Think Safety" Poster

"Think Safety" is the theme of a series of 16 new safety posters published by the Automatic Transportation Co., manufacturers of electric-driven industrial trucks, which illustrate how accidents involving fork trucks occur and how to prevent them. Each poster is designed to emphasize the importance of safe driving practices by fork truck operators, in order to prevent injury to themselves, plant personnel, or damage to the material being transported, plant equipment, and the truck.

The posters, which measure 11 inches by 17 inches, are suitable for display on bulletin boards in plants, warehouses and shipping docks, and are available free of charge from Dept. MPM, Automatic Transportation Co., 149 W. 87th St., Chicago 21, Ill.

Minneapolis-Moline Buys John Morrell Mfg. Co.

In a move to further diversify its business, Minneapolis-Moline Co., Hopkins, Minn., has announced the purchase for cash of John Morrell Mfg. Co., Elgin, Ill.

The purchase, according to J. Russell Duncan, president, marks Moline's entry into the field of electric materials handling equipment.

PI Plans New Glossary of Packaging Terms

Planning has begun for revision and updating of the Packaging Institute's "Glossary of Packaging Terms" and publication of the third edition of this basic reference for the packaging industry. The enlarged edition will contain more than 125 new definitions submitted by the U. S. Government services, plus a large number which have been collected since publication of the second edition in 1955, and many more expected to be accumulated by the Glossary Revision committee.

"Prevention Day" Business Session

The Seventh Annual Business Session of the Freight Loss and Damage Prevention Section will be held at the Roosevelt Hotel, New York City, March 30-31, 1960. Permission has been granted to hold the two-day session by the General Committee, Operating Transportation Division of the Association of American Railroads.

The program will enable shipper, receiver, and carrier representatives to mutually discuss their problems after hearing from authorities of the industry.

Norton to Important Post of Railway Express Agency

Francis S. Norton, former general traffic director of Fisher Body division, General Motors Corp., has been appointed assistant vice president, traffic, of Railway Express Agency, effective February 1, with headquarters at Detroit.

Following successive traffic assignments at Detroit with the Canadian Pacific Railway and the Michigan Central Railroad, Norton served as assistant traffic manager of Burroughs Machine Co. Later, he established the Domestic and Export Traffic department at Penberthy Injector Co.

AMA 29th National Packaging Exposition

The American Management Association's 29th National Packaging Exposition is scheduled to be held at Convention Hall, Atlantic City, N. J., April 4-7, 1960. An estimated 400 exhibitors are expected to attend, and the exhibits will cover the entire range of the packaging spectrum, from packaging machinery and equipment, packaging materials and supplies, and containers, to service organizations, associations, and publications.

Registration fee is $2.00, and is open to anyone with a business connection.

"All manufacturing, engineering, and quality efforts are in vain if the product reaches its destination in a damaged condition."

Hotpoint

ELIMINATED SHIPPING DAMAGE with CHICAGO MILL CONTAINERS!

"Up to about two years ago, shipping damage to the thermostats and grease troughs on Hotpoint's HRG7 SUPERline commercial electric ranges was occurring at an alarming rate. With Chicago Mill's engineering assistance shipping containers were designed specifically to provide total protection for these units, thereby eliminating this problem."

ED WACH, *Packaging Engineer*
Hotpoint Commercial Equipment Department

LARGE OR SMALL — CHICAGO MILL MAKES 'EM ALL!
A COMPLETE LINE OF CONTAINERS FOR EVERY SHIPPING PURPOSE!

FREE! Illustrated Catalog Describing Chicago Mill's Shipping Containers and Services!


PALLET BOXES — Wire Bound


PALLET BOXES — Hinged Corner


Cleated Boxes


E-Z Pak Cleated Corrugated (Watkins type)


Wirebound Crates


Wirebound Boxes


Corrugated


Hinged Corner Crates or Boxes

CHICAGO MILL AND LUMBER COMPANY
33 South Clark Street — Chicago 3, Illinois

PLANTS
- CHICAGO, ILLINOIS
- GREENVILLE, MISSISSIPPI
- HELENA, ARKANSAS
- ROCKMART, GEORGIA
- TALLULAH, LOUISIANA

Industry News

→ *from Page 73*

ing productivity with European techniques, power presses, stamping space-age metals, ultrasonics in a stamping plant, abrasives, and drawing compounds.

PERSONALS

The Wilcolator Co., Elizabeth, N.J., a wholly-owned subsidiary of **Ranco, Inc.**, announces the appointment of **A. M. Hoover** as president. **J. H. Cantlin,** vice president in charge of engineering, was named executive vice president.

J. A. Rumer has been made Regional manager of the **West Coast Enamel Div.** of **Pemco Corp.**, Baltimore, Md. He will replace Harry Ingersoll, who retired the first of the year. **Floyd Williams,** Pemco sales engineer, will assist Rumer in the West Coast area.

RUMER

CANTLIN

Plural components

→ *from Page 22*

ates in the gun head a high speed air motor powered mixer. Shaft speed in the mixer head is 5,000 rpm, and the mixing is accomplished by a series of roller bearings around the periphery of the head which revolve at 20,000 rpm. Up to eight pounds of resins can be mixed and sprayed per minute.

Gas refrigerator

→ *from Page 27*

power supply go off momentarily, the electric valve shuts back to a pilot flame. As soon as power is restored, proper draft is restored, the valves open, and the unit automatically lights. On abnormal failures, for instance, if the power is on but the fan stops, the safety bimetal thermostat overheats and shuts all the gas off (everything is shut off), and the pilot must be re-lighted manually.

Explanation of fan operation

There are three fans: one to cool the condenser, one in the freezer, and one in the refrigerator storage compartment. The circulation fans draw 12 watts each. The absorber fan (in unit compartment) draws 20 watts. The circulation fans run continuously except that the freezer fan shuts off during defrost and remains off approximately twenty-five minutes after defrost heater goes off.

Defrosting on the freezer evaporator is controlled by an electric timer and occurs once each 24 hours. Heat is applied to a section of the refrigerant circuit outside the back of the refrigerator. This heat forces ammonia vapor into the freezer evaporator, turning the evaporator into a condenser. This heats the evaporator and melts the frost. When the evaporator has defrosted, a thermostat turns off the heat. A safety cut-off is mounted near the defrost heater to protect it from overheating.

Defrost water from both evaporators drains into a trap on the outside, back of the refrigerator, and from there into a pan in the unit compartment where it evaporates.

Detail of burner operation

All types of gas can be used: manufactured, natural, mixed, L.P., or L.P.-air. Burner changes for varying gases can be made readily in the field.

In the event of power failure, both of the electric input control valves are closed, and the burner reduces to pilot flame. When power is resumed, one of the valves opens, restarting refrigeration.

By use of the input control valve, which is orificed, only one adjustment to the gas pressure need be made. Formerly, both a maximum and minimum flame adjustment and lighter tube adjustment were necessary.

To light the burner, it is necessary only to depress the push button on the input control valve and then light the escaping gas at the end of the burner. When the burner thermal valve opens, the flame will remain lighted.

The automatic ice maker is considered by some engineers and merchandising executives to be the greatest single feature of new refrigerators to accelerate obsolescence of models with conventional ice trays.

The ice maker in the 1960 Whirlpool gas refrigerator has been redesigned for compactness from the basic unit formerly used. *(See "Engineering details of the Servel automatic ice maker," from the August, 1957 issue of* MPM). It makes six moon-shaped cubes and stores them in a six-pound storage tray. The complete unit may be replaced from the front without moving the cabinet. The cabinet vapor seal need not be disturbed, should the ice maker need replacing.

EDITORIAL NOTE: Special credit is given to Bolyn Conaway, General Superintendent of Plant 7 at Evansville, for his technical assistance in connection with the development of this exclusive MPM feature.

★★★★★★★★★

COMING FEATURES

DESIGN

FOOD WASTE DISPOSER WITH SHOCK ABSORBER MOUNTING

WHAT TO LOOK FOR IN FUTURE APPLIANCE DESIGN

LATEST DESIGNS IN ELECTRIC HEATING EQUIPMENT

FABRICATION

NEW DIE FORMS ANY ANGLE TO SIXTY DEGREES

FABRICATING AT AVONCRAFT DIV., AVONDALE MARINE WAYS, INC.

NAMEPLATES WITH FLAME-CUT LETTERING

LATEST AUTOMATED LINE FOR STEEL CONTAINERS

FINISHING

PORCELAIN ENAMELING AT AVONCRAFT DIVISION

ENAMELING FURNACE HAS WIRE MESH BELT

PRODUCTION FINISHING ALUMINUM SIDING

FINISHING WATER HEATER PARTS AT HOTSTREAM

GENERAL

SPECIAL SECTION — MAY — THE COMPLETE BUSINESS, ENGINEERING AND PRODUCTION STORY OF KELVINATOR

"RELIABILITY" — FUTURE WORD FOR DESIGNERS

SPRAYABLE URETHANE FOAMS

VOLUME PRODUCTION OF PORTABLE ROOM HEATERS

MASTER SLAVE PROGRAMMING

EXCLUSIVE FEATURE ON CURTAIN WALL CONSTRUCTION

SPECIAL SECTION — JULY — THIRD ANNUAL SECTION DEVOTED TO AUTOMATIC MERCHANDISING INDUSTRY (COIN-OPERATED MACHINES)

NEWS

MONTHLY STATISTICAL REVIEW

STAFF EDITORIAL AND PHOTO COVERAGE OF ALL IMPORTANT INDUSTRY MEETINGS

★★★★★★★★★

ADVERTISERS' INDEX

	PAGE
AIR REDUCTION SALES CO.	52
AMERICAN NICKELOID CO.	81
ARMCO STEEL CORP.	1
BINKS MFG. CO.	54 & 55
BROWN-LIPE-CHAPIN DIV., GENERAL MOTORS CORP.	29
BURDETT MFG. CO.	72
CHICAGO MILL & LUMBER CO.	79
CHICAGO VITREOUS CORP.	65
CLAD-REX DIV., SIMONIZ CO.	4
CLEARING DIV., U.S. INDUSTRIES, INC.	2ND COVER
DESPATCH OVEN CO.	35
DOLE VALVE CO.	4TH COVER
DUDEK & BOCK SPRING MFG. CO.	70
FAHRALLOY CO., THE	14
FERRO CORP.	9
GENERAL INDUSTRIES CO., THE	10
GOODRICH CHEMICAL CO., B. F.	47
GRIGOLEIT CO., THE	70
HARRINGTON & KING PERFORATING CO., THE	37
HOMMEL CO., THE O.	59
HOUGHTON & CO., E. F.	22 & 23
INGRAM-RICHARDSON, INC.	15
INTERCHEMICAL CORP.	19
KERNS CO., L. R.	2
LOWE BROTHERS CO.	6
LUX CLOCK MFG. CO., INC., THE	38
MACCO PRODUCTS CO.	53
MARSCO MFG. CO.	16
MCLOUTH STEEL CORP.	17
MECHANICAL PRODUCTS, INC.	36
METAL PRODUCTS MANUFACTURING	74
METALWASH MACHINERY CORP.	71
MILLS PRODUCTS, INC.	20 & 21
NAGEL-CHASE MFG. CO., THE	63
NATIONAL LOCK CO.	50
NORTHWEST CHEMICAL CO.	64
OAKITE PRODUCTS, INC.	45
PARKER KALON DIV., GENERAL AMERICAN TRANSPORTATION CORP.	18
PEMCO CORP.	69
PFIZER & CO., INC., CHAS.	60 & 61
PYRAMID MOULDINGS, INC.	57
RANSBURG ELECTRO-COATING CORP.	7
ROLL FORMED PRODUCTS CO.	67
SHERWIN-WILLIAMS CO., THE	62
SOUTHERN SCREW CO.	5
SPRAYING SYSTEMS CO.	68
STANLEY SPRING MFG. CO.	28
TUTTLE & CO., H. W.	50
UNION STEEL PRODUCTS CO.	3RD COVER
UNIVERSAL CYCLOPS STEEL CORP.	11
UNIVERSAL SCREW CO.	46
WASHINGTON STEEL CORP.	73
WILCOLATER CO., THE	8
WYANDOTTE CHEMICALS CORP.	13

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OPPORTUNITY IN MECHANICAL ENGINEERING

A suburban Chicago firm is expanding its manufacturing activities and is interested in employing an outstanding mechanical engineer in the 30 to 40 age bracket.

Should be a graduate with experience in metalworking, equipment design, processes, and possess administrative capacity.

Good opportunity for the future.

Please submit resumé giving personal qualifications, salary requirements and experience to **E. H. Schmitt, Club Aluminum Products Co., 825-26th St., La Grange Park, Ill.**

PROJECT ENGINEER

A long-established Midwest manufacturer of home appliances has need for a development engineer with several years experience in the design of home laundry appliances to assist in devising improvements, cost reducing changes, and new features. Send resumé and salary requirements to **Box 3A, Dana Chase Publications, Inc., York St. at Park Ave., Elmhurst, Ill.**

Gas range programming

→ *from Page 28*

The new control system, based upon a new vapor-pressure principle, is said to hold oven temperatures within more precise limits than was previously possible — affording almost straight-line temperature control.

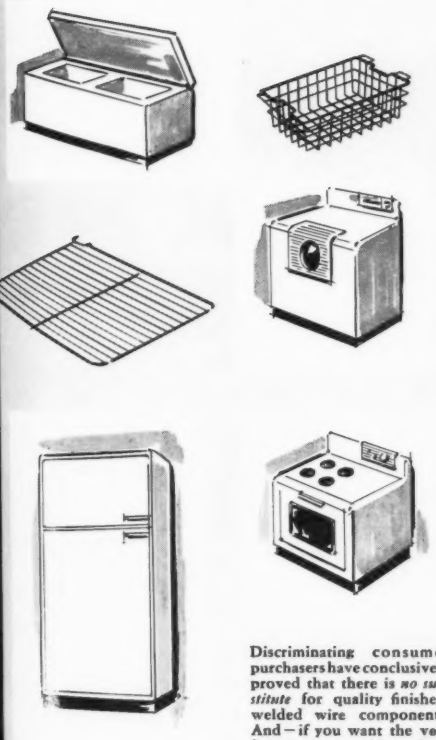
C. S. Stackpole, managing director, American Gas Association, had this to say in connection with the new development: "This new low temperature oven control system makes the modern gas range infinitely more versatile . . . We consider it a very important advance in the gas and gas range industries."

T. T. Arden, president of Robertshaw-Fulton Controls Co., whose engineers developed the system, made this comment, "We feel that the development of this new control system, which enables the gas range oven to do double duty . . . is an important development for the homemaker . . . *and* a part of the trend to more casual living."

keep this man in mind

.....when you design a new appliance

or restyle an old one



Discriminating consumer purchasers have conclusively proved that there is *no substitute* for quality finished, welded wire components. And—if you want the very best at a competitive price—just specify USP.

Is wire design your problem? If it concerns a product made of welded steel wire, designing-fabricating and finishing it is our business; as it has been for over half a century.

Anything . . . made of wire to your specifications. Any size, shape or quantity, in a wide range of attractive modern fiinishes.

We handle all details and *all* our facilities are within our own plants: design engineering, tooling, fabricating, finishing, inspecting and guaranteed on-time delivery. We have 385,000 square feet of the most modern wire forming, fabricating and finishing facilities to serve you better—plus hundreds of experienced people who make it their business to improve your business through the use of versatile, modern wire.

Why not make your manufacturing dollar go further? *Keep the USP man in mind.* He will survey your problem and provide a sound, economical solution—without obligation.

***You are Cordially Invited** . . . to investigate the advantages of Union Steel's wire product design and development service, without obligation. A phone call to NAtional 9-2181 (Albion) will bring immediate service.*

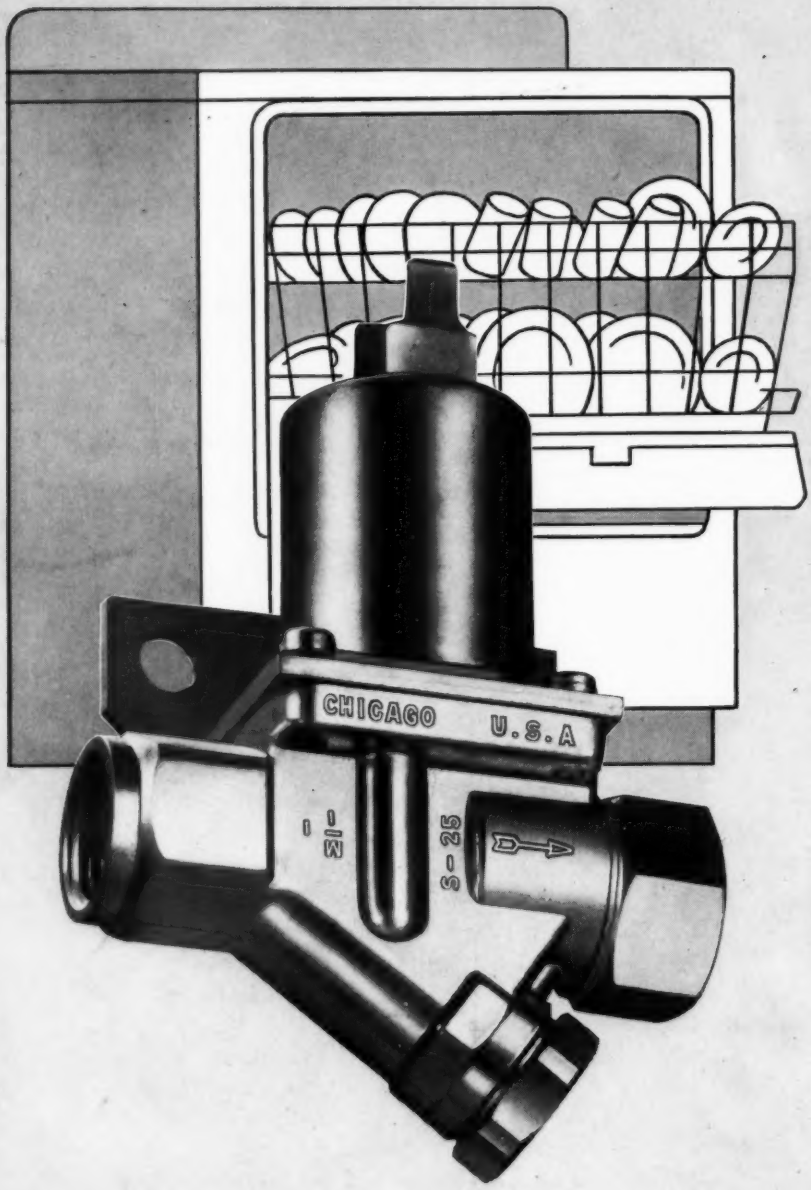
First Name in Welded Wire Products—

UNION STEEL PRODUCTS CO.

Contract Wire Division ALBION, MICHIGAN

Incoming dirt CAN'T CLOG this new

DOLE DISHWASHER VALVE



Solves troublesome service problem—keeps customers satisfied

Now . . . for the first time . . . a dishwasher shut-off valve that is not affected by the tiny particles of dirt found in most incoming water supplies.

The new Dole Single Solenoid Valve incorporates an entirely new principle. A unique diaphragm and rubber poppet arrangement momentarily hold dirt in suspension . . . digest it . . . pass it through without clogging or damaging the automatic control.

Other valve designs permit trapping and holding of dirt resulting in jamming and refusal to close properly . . . eventual valve failure . . . costly part replacement.

This new Dole S-25 Single Solenoid Shut-off Valve insures continuous trouble-free operation . . . does away with costly service problems . . . and most important . . . keeps customers satisfied.

Dole pioneered the use of solenoid valves for turning water on and off, and regulating flow in automatic dishwashers. This newest design is a good example of Dole's continuous program of product improvement and development . . . finding better solutions to problems of fluid control.

If your products or projects involve questions of flow rate, mixing, temperature control, shut-off, dispensing . . . Dole Valves may be your answer.

DESIGN DATA

The improved Dole (S-25 Series) Single Solenoid Shut-off Valve was designed for applications requiring moderate flow rates (up to 5 GPM) and dependable remote, electrical operation. Contains patented flow control, special Monel inlet screen and slow-closing diaphragm that eliminates water hammer. Pressure capacity—200 psi. In addition to dishwashers, engineered for use in ice cube machines, water softener equipment, drinking fountains and dispensers.

Control with

DOLE

Additional information about this or other Dole Solenoid Operated Valves may be obtained by writing

THE DOLE VALVE COMPANY
6201 Oakton Street • Morton Grove, Illinois
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